Acronym List

Acronym	Explanation
µg/kg	Microgram per Kilogram
ADQM	Analytical Data Quality Management
AOC	Area of Concern
ASTM	American Society for Testing and Materials
CFC	Chlorofluorocarbon
CMS	Corrective Measures Study
DNAPL	Dense Non-Aqueous Phase Liquid
DVM	Data Verification Module
EDD	Electronic Data Deliverable
EPA	U.S. Environmental Protection Agency
EqP	Equilibrium Partitioning
LCS/LCSD	Laboratory Control Spike/ Laboratory Control Spike Duplicate
LOE	Lines of Evidence
MDL	Method Detection Limit
mg/kg	Milligram per Kilogram
MS/MSD	Matrix Spike/ Matrix Spike Duplicate
NAPL	Non-Aqueous Phase Liquid
PCB	Polychlorinated Biphenyl
PID	Photoionization Detector
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/ Quality Control
RPR	Relative Percent Recovery
SPB	Sheet-Pile Barrier
SOC	Summed Organic Constituents
SVOC	Semi-Volatile Organic Compound
SWI	Sediment-Water Interface
TAL	Target Analyte List
TCL	Target Compound List
TIC	Tentatively Identified Compound
TOC	Total Organic Carbon
VOC	Volatile Organic Compound

Executive Summary

This document presents the data, findings, and recommendations of the Data Gap Phase III Investigation of the Delaware River Non-Aqueous Phase Liquid (NAPL) Delineation conducted offshore of Area of Concern (AOC) 1 at the Chemours Chambers Works Complex located in Deepwater, New Jersey. The purpose of the Phase III investigation was to complete the delineation of residual NAPL in the area between the northern and southern study areas and to confirm shallow sediment concentrations at and north of station E16-BOR-04 as identified in the *2016 Delaware River NAPL Delineation Investigation* (AECOM, 2017; referred to herein as the 2017 report). In addition, sediment samples were collected at station D15-BOR-25 for ongoing treatability studies. These treatability studies will evaluate optimized reagent blends for in-situ chemical treatment that can adequately and safely destroy the major NAPL components (Freon® and chlorobenzenes) in the deep sediment target treatment area.

A summary of the findings associated with this investigation is as follows:

- NAPL was not observed in the deep sediment in the area between the northern and southern NAPL areas identified in the 2017 report.
- Three additional stations and one confirmation station (E16-BOR-04) indicated possible residual NAPL presence in shallow (0 to 1.0-foot) sediment. Because these samples had low summed organic constituents (SOC) and few lines of evidence (LOE) for NAPL or were bounded by other samples with low SOC and few LOE, delineation is complete in the shallow sediment.

Based on the above findings, the delineation of residual NAPL offshore of AOC 1 has been completed. It is recommended that the ongoing treatability studies to address Freon containing NAPL should also be completed.

1.0 Introduction

This report presents the data, findings, and recommendations of the Data Gap Phase III Investigation of the Delaware River Non-Aqueous Phase Liquid (NAPL) Delineation conducted offshore of Area of Concern 1 (AOC 1) at the Chemours Chambers Works Complex (site) located in Deepwater, New Jersey (see Figure 1). This Phase III investigation was recommended based on the findings of the *2016 Delaware River NAPL Delineation Investigation* (AECOM, 2017; referred to herein as the 2017 report). The sampling plan that sets forth the work presented in this 2018 report was provided as Appendix H to the 2017 report (AECOM, 2017).

The purpose of the Data Gap Phase III investigation was to complete the delineation of the small isolated pockets of residual NAPL as identified in the 2017 report. In addition, in response to agency comments dated September 15, 2017, D15-BOR-24 was added to provide additional delineation confirmation west of station D15-BOR-16 in the southern study area, and another station D15-BOR-25 was added to collect sediment for ongoing treatability studies.

In particular, the following tasks were completed:

- Sediment samples were collected from beneath the sediment-water interface (SWI) beneath the Delaware River offshore of AOC 1 to delineate residual NAPL in deep sediments in the area between the northern and southern areas previously identified in the 2017 report.
- Sediment samples were collected from 0 to 1.0 foot beneath the SWI at all sample stations. In addition to NAPL constituents, e.g., volatile and semi-volatile organic compounds (VOCs and SVOCs), these shallow samples also included analyses for metals and polychlorinated biphenyls (PCBs). These constituents are not NAPL components but were collected to be available for other evaluations, such as ecological risk assessments, if needed. These data along with the NAPL component data from shallow and deep sediment samples are provided in maps and tables within this report.
- Sediment from 0 to 0.5-feet and 0.5-1.0 foot near E16-BOR-04 was resampled in the northern area to confirm previous detections.
- One additional core at the southwest extent of the south area was collected to confirm the previously delineated extent of residual NAPL.
- A sediment sample was collected at the base of the aquifer in the residual NAPL area at location D15-BOR-25 and submitted for treatability study analyses.

Additional information on the background of AOC 1 and the offshore NAPL program are presented in the 2017 report.

The focus of this investigation was to complete the delineation of NAPL as outlined in the approved work plan. Therefore, sediment concentrations were not compared to ecological screening benchmarks as part of this effort. Sediment data collected as part of this effort will be evaluated as part of an ecological evaluation under separate cover.

1.1 Report Organization

The remainder of this report is organized into the following sections:

- Section 2.0 details the sampling approach and analytical methodology.
- Section 3.0 provides the data quality assessment.
- Section 4.0 discusses methods used to evaluate the data.
- Section 5.0 details the findings of the NAPL delineation and evaluation.
- Section 6.0 presents the conclusions and recommendations.
- Section 7.0 lists the references cited in this report.

2.0 Field Sampling and Laboratory Analytical Methodologies

This section presents the sampling approach, field methodology, and laboratory analyses associated with the Data Gap Phase III investigation. Deviations from the sampling plan are also presented.

2.1 Sampling Approach

The *Delaware River NAPL Delineation Sampling Plan – Data Gap Phase III* (Appendix H in the 2017 report) was designed to meet the investigation objectives stated in Section 1.0 and included installation of nine borings located within and between the northern and southern areas (see Figure 2 and Appendix A). Two locations in the E16-BOR-04 area were sampled from 0 to 1.0 foot to confirm results presented in the 2017 report. One location, D15-BOR-24, was added to confirm the southwestern extent of DNAPL in the deep sediment of the southern area. Location D15-BOR-25 was added to collect a deep sediment sample for use in ongoing treatability studies that are evaluating methods to safely treat pockets of residual Freon containing NAPL that have been identified during previous investigations.

The specific data objective of each boring location is provided in the table below.

Sample	Location	Data Objective
E16-BOR-07 and E16-BOR-08	Next to, and north of, E16-BOR-04.	Confirm previous shallow sediment sample results.
D15-BOR-24	Southwest of station D15-BOR-16.	Confirm southern deep NAPL extent.
D15-BOR-25	Between station D15-BOR-15 and D15-BOR-18.	Collect a volume of deep sediment for treatability analysis.
D16-BOR-09 through D16-BOR-14 and D15-BOR-21 through D15-BOR-24	Grid samples, approximately 50 feet apart, between northern and southern areas.	Delineate NAPL, if any, in the area between northern and southern areas.

Sediment cores and associated samples were collected over a period of seven days from October 31, 2017 through November 7, 2017; no sampling was completed on Sunday, November 5, 2017 (see Figure 2 and Table 1). Shallow sediment samples were collected from the 0 to 0.5-foot and 0.5 to 1.0-foot intervals at all locations. Three deep samples were then collected from the remainder of the core between the 1-foot interval and the underlying aquitard. Sediment samples were collected at all stations using a 4-inch one-time use Lexan™ tubing and a vibracore sampling device. Multiple adjacent cores were collected as needed to accommodate sample volume requirements.

To collect deep sediment samples, i.e., from greater than 1 foot beneath the SWI, sediment cores were collected down to what would be the equivalent of the onshore base of the B aquifer. Multiple attempts were made, if needed, to reach total depth as indicated by the retrieval of B/C aquitard (silt or silty clay) material in the core. If refusal was encountered, the team offset and re-attempted the core. Cores from each attempt were retained, and the cores from the successful attempt to reach the B/C aquitard were opened and used for sampling at that location.

Cores from each station were opened and visually and texturally logged. Cores were screened to determine if visual NAPL staining or odors were present and screened with

a photoionization detector (PID) for evidence of NAPL presence. Samples were biased toward areas where the presence of NAPL, if any, was suspected. If no elevated PID readings or other evidence of NAPL were identified, then the samples were evenly spaced between the 1.0-foot interval and the top of the underlying aquitard. Sixty-six sediment field samples and four quality assurance/quality control (QA/QC) samples were collected for NAPL delineation (see Table 1).

2.2 Analytical Methodology

Sediment samples were shipped to Eurofins Lancaster Laboratories and SGS Laboratories for organic/inorganic analysis and grain size analysis, respectively. The parameters analyzed varied based on the depth of the sediment samples:

- Shallow sediment samples collected from the 0 to 0.5-foot and 0.5 to 1.0-foot intervals at each station and were analyzed for VOCs, SVOCs, chlorofluorocarbons (CFCs), metals, PCBs, total organic carbon (TOC), moisture, and grain size.
- Deeper sediment samples from beneath the 1-foot interval were analyzed for VOCs, SVOCs, CFCs, moisture, and TOC.
- One sample of the underlying B/C aquitard was analyzed for grain size.

In accordance with the approved sampling plan, the analytical methods used included:

- Target Compound List (TCL) VOCs by SW 846 8260B + an assessment of up to 15 Tentatively Identified Compounds (TICs)
- TCL SVOCs by SW 846 8270 + an assessment of up to 30 TICs
- CFCs by SW 846 8260FRN Modified
- Target Analyte List (TAL) Metals by U.S. Environmental Protection Agency (EPA) 6010/6020/7470A/7471A
- PCBs – 209 Congeners by EPA 1668A (low method detection limit)
- Moisture by EPA 160.3/SM 2540 G-1977
- Grain size by ASTM D422
- TOC by Method SW 846 9060

2.3 Deviations from the Sampling Plan

Minor deviations to the methods and procedures documented in the investigation sampling plan are presented below. Deviations included the following:

- A Ponar sampler was not used to collect samples from the 0 to 0.5-foot interval.
- An additional aquitard sample was collected for grain size analysis.
- An equilibrium partitioning (EqP) analysis was not conducted on 2017 sediment sample results.

As explained below, these deviations do not reduce data quality nor negatively affect the objectives of the NAPL delineation program.

The sampling plan specified that the 0 to 0.5-foot samples were to be collected using a Ponar sampler. However, samples were collected using a 4-inch one-time use Lexan™

liner driven by a vibracore sampling device. The use of the vibracore provides data that are sufficient or of higher quality for NAPL delineation.

Secondly, after further review of the grain size distribution curves presented in Appendix G of the 2017 report, an additional grain size sample was collected from the underlying aquitard layer to gain a better representation of the underlying silt to silty clay unit beneath the Delaware River.

Lastly, as indicated in the sampling plan (Appendix H of the 2017 report); analytical results from sediment samples were to be used to evaluate the presence and volumetric percentage of any residual NAPL within the sediment by EqP analysis using the NAPLANAL program (Mariner et al., 1997). Results of these analyses were to be integrated into the multiple lines of evidence (LOE) approach in order to determine the likely presence of NAPL in each sample. As indicated in the 2017 report, there is a strong correlation between summed organic constituents (SOC) and the positive indication for NAPL to be present through EqP analysis. In the 2017 report, it was determined that SOC had to exceed 135,000 micrograms per kilogram (µg/kg) for EqP analysis to indicate the presence of NAPL. Two samples collected as part of this investigation, D15-BOR-23-(0-0.5) and D16-BOR-11-(0.5-1.0), were near to the SOC threshold. Although these samples would likely not reduce to indicating the presence of NAPL under EqP analysis, they were identified due to their elevated SOC results. In addition, visual indications of NAPL (e.g., oily sheens) were also considered to be an LOE for potential NAPL presence. Two such locations, D16-BOR-12 and E16-BOR-7 were found to have visual evidence (i.e., sheens) and were included as possible residual NAPL locations. Based on the low SOC and lack of visual evidence in other sediment samples, it was determined that conducting the EqP analysis would not provide any additional or meaningful information and that all locations with observed NAPL indications or high SOC were identified as possible NAPL locations; therefore, EqP analysis was not conducted.

3.0 Data Quality

This section provides data quality assessment of the 2017 sediment dataset. As previously outlined in Section 2.1, 66 field samples and four QA/QC samples were collected from 13 stations. Table 1 presents a sample summary matrix of the laboratory analytical parameters for each sample. Summaries of sediment analytical detections are provided in Tables 2 through 8. Complete analytical results, including TIC results, are provided in Appendix B. Laboratory reports and data verification reports are provided in Appendix C. The NJDEP HazSite electronic data deliverable was uploaded to the NJDEP web page, and the associated acceptance letter can be found in Appendix D.

The sediment analytical data were reviewed in accordance with an in-house data review process to determine data usability. The data review process is used by the AECOM Analytical Data Quality Management Group (ADQM) to assist with the determination of data quality and usability for all Chemours sites. The electronic data deliverables received from the laboratory are loaded into the Locus EIM™ database and processed through a series of data quality checks, which are a combination of software [Locus EIM™ database Data Verification Module (DVM)] and manual reviewer evaluations. The data review performs a summary-level validation.

The review process includes comparing available laboratory data deliverables [hardcopy and electronic data deliverables (EDD)] versus the original project specifications, examining the completed chain of custody, thoroughly reviewing the Laboratory Case Narrative and deliverables as appropriate, and using the automated DVM during the data evaluation. Data qualifiers are applied, and corrective action is initiated as appropriate.

The DVM check consisted of an evaluation of the data based on hold times, blank contamination, matrix spike (MS)/matrix spike duplicate (MSD) recoveries, MS/MSD relative percent differences, laboratory control spike/control spike duplicate (LCS/LCSD) recoveries, LCS/LCSD relative percent differences, and surrogate recoveries.

Method QC information, (e.g., calibration information, internal standard recoveries, instrument tunes, etc.) is not included in the Locus EIM deliverables specification. As such, this information is not evaluated as part of the automated DVM. Method QC issues are to be reported by the laboratory in the Laboratory Case Narrative and are evaluated as part of the manual review of the case narrative by ADQM personnel.

Based on the QA/QC data review conducted during the investigation, some of the following data qualifiers were applied to the sediment and blank data.

Qualifier	Definition
R	Unusable result. Analyte may or may not be present in the sample.
J	Analyte present. Reported value may not be accurate or precise.
UJ	Not detected. Reporting limit may not be accurate or precise.
B	Not detected substantially above the level reported in the laboratory or field blanks

As summarized in the DVM narrative, data review indicates that most of the sample results were considered usable in consideration of the objectives for the investigation with the exception that the non-detect result for hexachlorocyclopentadiene in one sediment sample is qualified R and considered to be unusable due to very poor relative percent recovery (RPR) values in the associated MS/MSD analyses.

Minor data qualifications included the following:

- Results for some PCB congeners and homologs, sodium, and TOC in some sediment samples are qualified B due to a comparable concentration found in the associated laboratory method blanks.
- Some additional sample results, or reporting limits for non-detect results, are qualified as estimated due to surrogate spike, blank spike, or matrix spike recoveries outside criteria, poor matrix spike precision, and poor field or laboratory duplicate precision.
- Sample results were qualified as estimated ("J") when the sample results were found between the method detection limit (MDL) and practical quantitation limit (PQL).
- Sample results for TICs reported by the laboratory were qualified as estimated ("J").

4.0 Data Evaluation

The data generated during this investigation were evaluated to satisfy the sampling objectives identified in Section 1.0. The evaluation included the following:

- Review field observations, cross sections, data posting maps, and any other available data to establish LOE that indicates the presence of NAPL.
- Using the multiple LOE, determine the extent of NAPL within the sediment beneath the Delaware River to address data gaps identified in the previous investigation.

This section presents a discussion of the data evaluation procedures that were applied and the findings associated with the evaluation. Summaries of all LOE observations for each station are provided in LOE summary tables in Appendix E.

4.1 NAPL Evaluation

The multiple LOE method, as described in Kueper and Davies (2009), was used to evaluate sediment samples to determine the presence of NAPL. These LOE often include the evaluation of laboratory analytical data associated with the constituents known to be components of the NAPL in this study area, as well as the consideration of physical conditions (color, staining, texture, etc.) as noted in the investigation boring logs found in Appendix A.

The LOE evaluation method included assessment of the following:

- SOC concentrations: These are the summation of the concentrations of all detected VOCs, SVOCs, and CFCs within a sample (presented as sums with no TICs included). The top five detections of each class are presented in Figures 3 through 6.
- Visual indications: This is any visual evidence that suggests the presence of NAPL within sediment, such as sheen, separated phases, or color changes;
- Elevated PID readings: These readings indicate the presence of organic vapors.

4.1.1 Equilibrium Partitioning (EqP) Analysis

As previously discussed, the SOC of most samples were lower than the threshold of 135,000 µg/kg for NAPL presence. The two samples, D15-BOR-23-(0-0.5) and D16-BOR-11-(0.5-1.0), were near the threshold and were identified as such. Therefore, EqP was not conducted as part of this evaluation.

4.1.2 Summed Organic Constituents (SOC)

The SOC concentration is the summation of all detected compounds on the VOC, SVOC, and CFC target compound list in each sample. When used with EqP analysis, the SOC concentration can be used to establish a minimum threshold above which the mass of organics within a sediment sample can no longer be solely dissolved or sorbed and separate phase NAPL is also present. Once this threshold has been established for a site and the constituents of concern and sediment matrix characteristics remain the same or similar, then the SOC can be used to screen samples for the presence of NAPL without additional EqP analysis. Based on the comparison of EqP to SOC results presented in the 2017 report, constituents are assumed to be present as a separate

phase NAPL (dense or light) when the SOC concentration of a sediment sample reaches approximately 135,000 µg/kg.

An initial screening of the SOC data was undertaken to determine the potential presence of NAPL. Figure 7 and Table 9 show all samples collected and their SOC concentrations. Based on the analysis of the sediment samples, the mean SOC value is 10.74 milligrams per kilogram (mg/kg) (see Figure 7). Two samples were near the SOC threshold for DNAPL: D16-BOR-11-(0.5-1.0) = 117 mg/kg and D15-BOR-23-(0-0.5) = 126.6 mg/kg). These locations are shown on Figure 8.

4.2 Other LOE for Horizontal and Vertical Characterization of NAPL

Although elevated SOC values, though less than the SOC threshold for NAPL, were observed in sample D16-BOR-11-(0.5-1.0), there were no other LOE for NAPL at that sample location. However, sheen and odors were also observed in the 0 to 1-foot interval at D15-BOR-23, which also had elevated SOC. Each of these locations is identified on Figure 8.

No samples from stations D16-BOR-12 or E16-BOR-07 approached the SOC threshold for DNAPL. However, odors and sheens were observed in the 0 to 1.0-foot intervals at these locations. Therefore, these locations have been included on Figure 8 as possible residual NAPL locations.

Although odors and PID readings were observed at various depths at other locations, together these multiple LOE, in conjunction with laboratory analyses, SOC evaluations, and visual observations, did not support the determination for the potential presence of NAPL at other locations.

4.3 Confirmation Samples

Shallow sediment samples were collected at E16-BOR-07 for the purpose of confirming the 2016 results from sample E16-BOR-04(0.5-1.0). SOC values at E16-BOR-07 in the 0 to 0.5-foot interval are elevated at 41,000 µg/kg and in the 0.5- to 1-foot interval at 30,000 µg/kg, although much lower than the threshold for NAPL. However, a slight sheen was also observed at this location. These LOE suggest the possible presence of residual NAPL at this station, which supports the conclusions of the analysis conducted at location E16-BOR-04 as presented in the 2017 report.

5.0 Discussion of NAPL Distribution

This section discusses the subsurface lithology underlying the Delaware River and the distribution of the identified NAPL in the area between the northern and southern area and at the confirmation sample location.

5.1 Subsurface Lithology

Borings logs and grain size results can be found in Appendices A and H, respectively. A cross-section location map, three cross-sections perpendicular to the shoreline, and two cross-sections parallel to the shoreline are presented as Figures 10 through 15.

Based on the geologic logs and cross-sections, the sediments offshore of AOC 1 are generally up to 10 feet thick and are underlain by a silty clay layer identified as B/C Silt on the cross-sections. The sediments are predominately sand to silty sand with gravel to a gravelly sand unit with a basal gravel and cobble layer observed at several locations. The underlying silty clay layer is coincident in depth and appearance to that of the B/C aquitard that is mapped at onshore areas. The silty clay layer was encountered at depths ranging from 6.2 to 11.4 feet below the SWI. The silty clay layer is described as dark gray to strong brown, orange or red, silty clay (see Appendix A). Based on 2016 and 2017 data, the silty clay layer is from 2 feet to greater than 5 feet thick. Beneath the silty clay layer are sediments of the underlying C aquifer. Typically, the C/D aquitard and D aquifer underlie the C aquifer. However, based on projected depths from onshore locations, the regional Cretaceous age aquitard (D/E aquitard), which is also considered to be the base of the shallow hydrogeologic system in AOC 1, is from 15 feet to approximately 25 feet below the bottom of the encountered silty clay layer. Therefore, the C/D aquitard is not present in this area of the site, and the gravelly sands of the C aquifer disconformably overlie the fine to medium sands of the D aquifer.

5.2 NAPL Distribution

The following sections discuss the distribution of identified NAPL within the shallow (0 to 1.0 foot below the SWI) and deeper sediments beneath the Delaware River.

5.2.1 Shallow Sediment

Sample stations with NAPL indicated in the shallow, 0 to 1.0-foot, interval by multiple LOE are shown in Figure 8. This figure includes those locations previously identified in 2009 and 2016 as well as the four new locations identified in this report: D16-BOR-11-(0.5-1.0), D15-BOR-23-(0-0.5), D16-BOR-12, and E16-BOR-07. SOC is also indicated on Figure 8. However, although the threshold for NAPL presence was previously determined to be approximately 135,000 µg/kg, visual LOE in the form of slight sheens on the water also suggested the presence of NAPL at stations D16-BOR-12 and E16-BOR-07 even though the SOC at these locations was below the threshold for NAPL. The observed sheens could be due to very localized occurrences of residual NAPL that were not captured in the targeted sampling and were therefore "missed," giving an inconsistently low SOC laboratory result.

Although slight sheens were noted at D15-BOR-23, D16-BOR-12, and E16-BOR-07, other lines of evidence for NAPL were not identified in the shallow sediment. However, some sediment samples with high SOC values were present (see Figure 8). As described in the 2017 report, the higher SOC values are likely remnants associated with

historical releases. Site constituents within these discharges adsorbed to the shallow sediments and remain as detectable patches of site constituents. The process waste outfalls along the Delaware River have been sealed, and process wastewater is now diverted to the wastewater treatment plant for treatment (Preliminary Assessment Report, URS, 2006).

Although elevated SOC areas are present in the shallow sediment in small isolated areas (see Figure 8), horizontal delineation is complete for NAPL in the shallow sediment.

5.2.2 Deep Sediment

Based on the 2016 LOE evaluation, pockets of residual NAPL are present at the base of the aquifer in the northern and southern areas (see Figure 9), which is equivalent to the lower portion of the on-site B aquifer. Based on the 2017 sampling program, no additional NAPL locations were identified at the nine stations in the area between the northern and southern areas. NAPL was also not observed at any depth at station D15-BOR-24, confirming the delineation previously mapped of NAPL at the southwest extent of the southern area. No NAPL locations were identified at the nine stations sampled to fill in the data gap area between the northern and southern areas.

6.0 Conclusions and Recommendations

The purpose of the Data Gap Phase III investigation was as follows:

- Complete the delineation of the small isolated pockets of residual NAPL as identified in the 2017 report.
- Confirm previous analysis of shallow sediment from E16-BOR-04.
- Confirm the previously delineated southwest extent of the southern area.
- Collect deep sediment samples from within the extent of the southern NAPL areas.

Overall, the objectives of the investigation have been met. The delineation of NAPL has been completed in the shallow sediment and deep sediments beneath the Delaware River. More specifically:

- No NAPL was observed in the deep sediments in the area between the northern southern areas.
- Three additional stations and one confirmation station (E16-BOR-04) indicated possible residual NAPL presence in shallow (0 to 1.0-foot) sediment. Because these samples had low SOC and few LOE for NAPL or were bounded by other samples with low SOC and few LOE, delineation is complete in the shallow sediment.
- Sediment was collected from one location (D15-BOR-25) at the base of the aquifer and submitted for treatability studies.

Based on the above findings, the following path forward activities are recommended:

- No additional NAPL delineation activities are recommended at this time.
- The on-going treatability studies to evaluate optimized reagent blends for in-situ chemical treatment that can adequately and safely destroy the major NAPL components (Freon and chlorobenzenes) should be completed.

7.0 References

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Mariner, P. E., M. Jin., and R.E. Jackson. 1997. *An Algorithm for the Estimation of NAPL Saturation and Composition from Typical Soil Chemical Analyses. Groundwater Monitoring & Remediation*, 17: 122–129.

URS. 2006. *Preliminary Assessment Report*. DuPont Chambers Works Complex. Deepwater, New Jersey.

Appendix A

Boring Logs

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-21

Sheet 1 of 2

Date(s) Drilled	11/4/2017 - 11/4/2017	Logged By		Checked By	C.Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	13.0 feet
Type of Boat / Barge	OSI Barge	Contractor	Ocean Surveys Inc.	Field Core Recovery	10.6 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	5.3 feet
Location	N 316176.710 E 208667.290	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
	0	1.7			0-0.5' very soft, saturated, black to gray green, organic rich SILT, sticks/wood, a layer of oyster shells; (modern DE River sediment)		0.0-0.5' Sample
-5		2.3			0.5-1.0' very soft (sticky), saturated, dark gray green to black, silty CLAY, shells throughout interval	Strong petroleum odor.	0.5-1.0' Sample
	1				1.0-2.3' medium dense, variegated brown to reddish, greenish brown, m-c SAND (85-90%), few gravel (10%), trace silt		
-6			0.1		2.0-2.4' loose, wet, orange brown, SAND, trace micaceous silt, oxide bands present; (could be weathered Wissahickon Schist)		
	2		0.1		2.4-2.6' loose, wet, brown to orange brown, sub-rounded to rounded coarse GRAVEL/COBBLES (75%), little sand (25%), sharp contact above		
-7					2.6-2.8' dark brown to gray brown, SAA		
	3		2.1		2.8-3.6' loose, wet, brownish green to greenish brown, tan , SAND (80%), little gravel (20%)		
-8			2.4		3.6-3.8' loose but lightly cemented, wet, strong orange brown to brick red, hardpan layers of f-m SAND, layers of coarse sand, oxide coating on quartz		
	4		4.8		3.8-4.7' loose, wet, greenish brown to gray brown with orange, SAND (75-80%), little rounded medium gravel (15-20%), trace micaceous silt, oxide layering, slight odor	Slight odor	
-9		0.08	1.2		4.7-5.3' loose, wet, brown to strong brown, SAND, some coarse gravel		4.5-5.0' Sample
	5						
-10			3.2		5.3-6.6' loose, wet, brown to medium brown, f-m SAND (90%), few gravel (5-10%), trace micaceous silt, 0.5" thick layer of fine gravel near base of unit		
	6		3.2				6.0-6.5' Sample (MS/MSD)
-11		2.2	10.8		6.6-6.8' loose, wet, medium brown, f-m SAND,		
			31.4		6.8-8.0' loose, wet, brown to reddish brown, fine grading down to coarse GRAVEL (75%), little coarse sand (25%), erosional contact above	Chemical odor at base	
-12	7		20.9				
			3.2				7.8-8.0' Sample
	8	0.4	0.7		8.0-8.2' wet, strong orange brown to tan, plastic, CLAY (70%), little silt (30%) hardpan, some oxide present, erosional contact above		8.0-8.3' Sample (Aquitard)
-13		11.2	1.4		8.21-10.3' stiff, wet, gray to dark gray to black gray, plastic, silty CLAY, very thin layers of vf-f sand, trace white rounded dropstones, some varves, very sharp contact above.		
	9		0.4				
-14			0.7				
	10						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-21e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-21

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10		1.2		10.3-10.6' very stiff, wet to saturated, light gray to gray, silty CLAY grading down to silty fine SAND, trace mica 10.6-13.0' Lost Recovery		
-16	11						
-17	12						
-18	13				End of Boring		
-19	14						
-20	15						
-21	16						
-22	17						
-23	18						
-24	19						
-25	20						
-26	21						
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-21e

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-22

Sheet 1 of 2

Date(s) Drilled	11/3/2017 - 11/03/2017	Logged By		Checked By	C.Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	13.4 feet
Type of Boat / Barge	OSI Barge	Contractor	Ocean Surveys Inc.	Field Core Recovery	12.6 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	8.0 feet
Location	N 316149.010 E 208717.680	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
	0		0		0-0.5' very soft, saturated, gray green, SILT, some sticks; (modern DE River sediment)	Strong petroleum odor	0.0-0.5' Sample
-5		6.8	1.8		0.5-1.0' loose becoming more dense with depth, wet, dark gray, poorly sorted SAND (85-90%), few silt (10%), trace coarse gravel	Strong petroleum odor.	0.5-1.0' Sample
		0.4					
	1		9.3		1.0-3.6' brown to reddish brown, SAND (85-90%), few silt (10%), trace sub-rounded to rounded gravel, mica present	Odor	
-6							
	2		2.6				2.0-2.5' Sample
		1.1					
-7							
	3		0				
-8					3.6-5.5' loose, wet, reddish brown to brown, SAND, trace silt, <1" thick layers of coarse sand, red oxide layering		
	4		10.2				
-9			8.8				
	5		15.9				
-10			1.2		5.5-7.3' loose, wet, medium brown to brown, m-c SAND and sub-rounded to rounded fine GRAVEL	Strong chemical odor.	
	6		49.7				
-11			94.4				
	7		151				7.0-7.5' Sample
		0.2			7.3-7.6' wet to saturated, burgandy color, weathered siltstone COBBLES	Strong chemical odor.	
-12			50.5		7.6-8.0' loose, wet to saturated, brown to orange brown, m-c SAND, trace silt		7.8-8.0' Sample
	8	7.8					
		12.3	91		8.0-8.2' hard, wet to saturated, strong oxide red brown, hardpan SAND		8.0-8.2' Sample (+DUP) 8.0-8.5' Metals
-13					8.2-8.6' wet to saturated, strong orange to tan brown, plastic, clayey SILT, oxide layering, some black oxide nodules		
	9				8.6-9.6' moist to wet, gradual color change from oxide orange to tan brown, plastic, silty CLAY, few very fine sand, sandy orange oxide layers		
-14			36		9.6-10.0' stiff, wet, dark gray to gray brown, plastic, CLAY and SILT, trace fine gravel,		
	10						

Report: DUPO...1_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-22e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-22

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10				trace mica, microfossils present, trace white rounded dropstones, gradual contact above.		
			25.9		10.0-12.6' loose, wet to saturated, light tan to white tan, f-m SAND, trace rounded fine gravel, some orange oxide nodules, sharp contact above		
-16	11		16.3				
			4.6				
-17	12		10.3				
			0		12.6-13.4' Lost Recovery		
-18	13		17.3		End of Boring		
-19	14						
-20	15						
-21	16						
-22	17						
-23	18						
-24	19						
-25	20						
-26	21						
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-22e

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-21

Sheet 1 of 2

Date(s) Drilled	11/4/2017 - 11/4/2017	Logged By		Checked By	C.Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	13.0 feet
Type of Boat / Barge	OSI Barge	Contractor	Ocean Surveys Inc.	Field Core Recovery	10.6 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	5.3 feet
Location	N 316176.710 E 208667.290	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
	0	1.7			0-0.5' very soft, saturated, black to gray green, organic rich SILT, sticks/wood, a layer of oyster shells; (modern DE River sediment)		0.0-0.5' Sample
-5		2.3			0.5-1.0' very soft (sticky), saturated, dark gray green to black, silty CLAY, shells throughout interval	Strong petroleum odor.	0.5-1.0' Sample
	1				1.0-2.3' medium dense, variegated brown to reddish, greenish brown, m-c SAND (85-90%), few gravel (10%), trace silt		
-6							
	2		0.1		2.0-2.4' loose, wet, orange brown, SAND, trace micaceous silt, oxide bands present; (could be weathered Wissahickon Schist)		
-7			0.1		2.4-2.6' loose, wet, brown to orange brown, sub-rounded to rounded coarse GRAVEL/COBBLES (75%), little sand (25%), sharp contact above		
	3				2.6-2.8' dark brown to gray brown, SAA		
			2.1		2.8-3.6' loose, wet, brownish green to greenish brown, tan , SAND (80%), little gravel (20%)		
-8			2.4		3.6-3.8' loose but lightly cemented, wet, strong orange brown to brick red, hardpan layers of f-m SAND, layers of coarse sand, oxide coating on quartz	Slight odor	
	4		4.8		3.8-4.7' loose, wet, greenish brown to gray brown with orange, SAND (75-80%), little rounded medium gravel (15-20%), trace micaceous silt, oxide layering, slight odor		
-9		0.08	1.2		4.7-5.3' loose, wet, brown to strong brown, SAND, some coarse gravel		4.5-5.0' Sample
	5						
-10			3.2		5.3-6.6' loose, wet, brown to medium brown, f-m SAND (90%), few gravel (5-10%), trace micaceous silt, 0.5" thick layer of fine gravel near base of unit		
	6		3.2				6.0-6.5' Sample (MS/MSD)
-11		2.2	10.8		6.6-6.8' loose, wet, medium brown, f-m SAND,		
			31.4		6.8-8.0' loose, wet, brown to reddish brown, fine grading down to coarse GRAVEL (75%), little coarse sand (25%), erosional contact above	Chemical odor at base	
	7		20.9				
-12			3.2				7.8-8.0' Sample
	8	0.4					
		11.2	0.7		8.0-8.2' wet, strong orange brown to tan, plastic, CLAY (70%), little silt (30%) hardpan, some oxide present, erosional contact above		8.0-8.3' Sample (Aquitard)
-13			1.4		8.21-10.3' stiff, wet, gray to dark gray to black gray, plastic, silty CLAY, very thin layers of vf-f sand, trace white rounded dropstones, some varves, very sharp contact above.		
	9		0.4				
-14			0.7				
	10						

Report: DUPO..._ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-21e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-21

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10		1.2		10.3-10.6' very stiff, wet to saturated, light gray to gray, silty CLAY grading down to silty fine SAND, trace mica 10.6-13.0' Lost Recovery		
-16	11						
-17	12						
-18	13				End of Boring		
-19	14						
-20	15						
-21	16						
-22	17						
-23	18						
-24	19						
-25	20						
-26	21						
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-21e

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-22

Sheet 1 of 2

Date(s) Drilled	11/3/2017 - 11/03/2017	Logged By		Checked By	C.Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	13.4 feet
Type of Boat / Barge	OSI Barge	Contractor	Ocean Surveys Inc.	Field Core Recovery	12.6 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	8.0 feet
Location	N 316149.010 E 208717.680	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	Sum Organics, - mg/kg	PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
	0		0		0-0.5' very soft, saturated, gray green, SILT, some sticks; (modern DE River sediment)	Strong petroleum odor	0.0-0.5' Sample
-5		6.8	1.8		0.5-1.0' loose becoming more dense with depth, wet, dark gray, poorly sorted SAND (85-90%), few silt (10%), trace coarse gravel	Strong petroleum odor.	0.5-1.0' Sample
	1	0.4	9.3		1.0-3.6' brown to reddish brown, SAND (85-90%), few silt (10%), trace sub-rounded to rounded gravel, mica present	Odor	
-6							
	2		2.6				2.0-2.5' Sample
-7		1.1					
	3		0				
-8					3.6-5.5' loose, wet, reddish brown to brown, SAND, trace silt, <1" thick layers of coarse sand, red oxide layering		
	4		10.2				
-9			8.8				
	5		15.9				
-10			1.2		5.5-7.3' loose, wet, medium brown to brown, m-c SAND and sub-rounded to rounded fine GRAVEL	Strong chemical odor.	
	6		49.7				
-11			94.4				
	7		151				7.0-7.5' Sample
-12		0.2			7.3-7.6' wet to saturated, burgandy color, weathered siltstone COBBLES	Strong chemical odor.	
			50.5		7.6-8.0' loose, wet to saturated, brown to orange brown, m-c SAND, trace silt		7.8-8.0' Sample
	8	7.8			8.0-8.2' hard, wet to saturated, strong oxide red brown, hardpan SAND		8.0-8.2' Sample (+DUP) 8.0-8.5' Metals
-13		12.3	91		8.2-8.6' wet to saturated, strong orange to tan brown, plastic, clayey SILT, oxide layering, some black oxide nodules		
	9				8.6-9.6' moist to wet, gradual color change from oxide orange to tan brown, plastic, silty CLAY, few very fine sand, sandy orange oxide layers		
-14			36		9.6-10.0' stiff, wet, dark gray to gray brown, plastic, CLAY and SILT, trace fine gravel,		
	10						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-22e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-22

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10				trace mica, microfossils present, trace white rounded dropstones, gradual contact above.		
			25.9		10.0-12.6' loose, wet to saturated, light tan to white tan, f-m SAND, trace rounded fine gravel, some orange oxide nodules, sharp contact above		
-16	11		16.3				
	12		4.6				
-17			10.3				
	13		0		12.6-13.4' Lost Recovery		
-18			17.3		End of Boring		
-19	14						
-20	15						
-21	16						
-22	17						
-23	18						
-24	19						
-25	20						
-26	21						
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-22e

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-23

Sheet 1 of 2

Date(s) Drilled	11/3/2017 - 11/3/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	13.0 feet
Type of Boat / Barge	OSI Barge	Contractor	Ocean Surveys Inc.	Field Core Recovery	11.8 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	7.3 feet
Location	N 316202.470 E 208737.410	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
	0	126.6			0-0.5' very soft, saturated, gray green, SILT; (modern DE River sediment)	Strong petroleum odor	0-0.5 Sample (+Dup)
-5		42.2			0.5-1.0' soft becoming more stiff with depth, wet to saturated, medium to dark gray green, SILT, some f-m sand, increasing sand concentration with depth, trace mica	Strong petroleum odor. Sheen on water.	0.5-1.0' Sample
	1		10.5		1.0-2.3' wet, loose, dark gray to brown gray, becomes reddish brown with depth, m-c SAND (75%), little angular to sub-angular fine gravel (25%)		
-6			45				
			35				
	2		36				
-7			40		2.3-2.5' loose, wet, tan brown to gray brown, varves, very fine SAND, trace silt, sandy orange brown oxide layer at base		
					2.5-3.75' loose, wet to saturated, reddish brown, poorly sorted m-c SAND (75%), little sub-angular to sub-rounded f-m gravel (25%)		
	3		58				3.0-3.5 Sample
-8		0.32	33				
	4				3.75-4.1' loose, wet to saturated, strong orange brown to yellow brown, coarse SAND (90-95%), few angular gravel (5-10%)		
-9			168		4.2-4.8' loose, medium to strong orange brown, SAND and coarse GRAVEL		
	5		63.8		4.8-5.0' loose, wet to saturated, tan with some oxide orange at base, very fine SAND, some silt		5.0-6.0 Sample
-10		0.03			5.0-5.8' loose, wet to saturated, strong orange brown to brown, well sorted SAND, sharp contact above		
	6		170.3		5.8-6.0' loose, wet to saturated, tan to brown tan, f-m SAND, little coarse sand, trace rounded gravel		
-11			152				
	7				6.8-7.5' loose, wet to saturated, brown grading into brown orange at base, m-c SAND, some sub-rounded to rounded gravel		
-12			116.4				
	8		38.2		7.75-8.75' loose, wet to saturated, dark brown to gray brown, SAND (75%), little sub-rounded to rounded gravel (25%)	Strong Chemical odor	8-8.5' Sample
-13		0.23	152 116.4 38 201				
	9		86.3		8.75-9.2' dark brown to gray brown, SAA, orange oxide present on gravel	Chemical Odor	
-14		13.22	18.8		9.2-9.21' sharp erosional contact 9.21-10.8' wet to saturated, strong tan orange oxide, color change from oxide orange to gray at 9.75', very fine sandy SILT, increasing sand concentration with depth, some varves top, oxide sand at base		9.5-9.7 Sample (Top Aquitard)
	10						

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-23

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10		5.1				
			15.5				
-16	11				10.8-11.8' medium stiff increasing to very stiff with depth, wet to saturated, dark gray, plastic, silty CLAY		
-17	12		0.0		11.8-13.0' Lost Recovery		
-18	13				End of Boring		
-19	14						
-20	15						
-21	16						
-22	17						
-23	18						
-24	19						
-25	20						
-26	21						
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-23e

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-24

Sheet 1 of 2

Date(s) Drilled	11/1/2017 - 11/1/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	12.4 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	9.8 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	3.4 feet
Location	N 315925.390 E 208484.490	Sampling Method(s)	liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-4	0	1.2			0-0.2' very soft, saturated, medium gray to black, SILT; (modern DE River sediment)		Sampled 0.0-0.5
		58.6			0.2-1.0' loose, wet, gray and brown gray, sub-rounded f-m SAND		Sampled 0.5-1.0
-5	1		3.0		1.0-1.2' dark gray to black, fine SAND, a layer of silty clay	Slight Petroleum Odor	
					1.2-2.2' loose, saturated, brown, fine SAND		
-6	2		4.5		2.2-3.1' loose, wet to saturated, brown, angular fine grading down to coarse SAND (75%), little rounded coarse gravel (25%) at depth	Strong Petroleum Odor	
		0.2					Sampled 2.7-3.0'
-7	3		11.5		3.1-4.9' loose, wet, brown to brown orange, sub-angular to sub-rounded m-c SAND		
-8	4						
-9	5		30-45		4.9-5.1' soft, wet to saturated, dark gray to black, clayey SILT, trace red/orange oxide red/orange		Sampled 5.0-5.5'
		0.6			5.1-5.3' loose, wet, oxide brown, f-m SAND, sharp contact above		
					5.3-5.7' loose, wet, gray, sub-rounded SAND (70-80%), little rounded coarse gravel (10-20%)	Chemical Odor	
-10	6				5.7-6.2' loose, wet, dark gray, SAND (75%), little sub-rounded to rounded coarse gravel (25%), trace silt (<5%), cobble at bottom		Sampled 6.0-6.5'
		0.2			6.2-7.0' wet, gray to brown to oxide orange, plastic, silty CLAY, very fine sand layers, contact above	Chemical Odor	
-11	7	22.0	75+/20/5		7.0-7.2' wet to saturated, loose, dark brown black, angular m-c SAND (85%), few rounded gravel (10-15%), one cobble	Strong Chemical Odor.	Sampled 6.5-7.1 (clay)
		2.1	<20				7.0-7.2' Sample
		27.5 (D)			7.2-9.8' medium orange tan, brown, medium gray, tan, tan white, varves, CLAY (70%), little silt (30%), increasing clay concentration with depth, thin layer of oxide orange sand at base, sharp contact above		7.2-7.7' Sample (+Dup)
-12	8						
-13	9						
-14	10				9.8-12.4' Lost Recovery		

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-24e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-24

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-14	10						
-15	11						
-16	12						
-17	13				End of Boring		
-18	14						
-19	15						
-20	16						
-21	17						
-22	18						
-23	19						
-24	20						
-25	21						
-26	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-24e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-25

Sheet 1 of 2

Date(s) Drilled	11/04/2017 - 11/04/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	13.0 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	11.9 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	7.8 feet
Location	N 315983.180 E 206668.170	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
	0		NA		Core Not Opened 0-7.8 feet. Sample for Treatability only from bottom of B Aquifer. Core A=7.9-9.1' sampled, Core B=5.4-6.9' sampled, Core C=7.0-8.6' Sampled		
-4	1						
-5	2						
-6	3						
-7	4						
-8	5						
-9	6						
-10	7						
-11	8		100+		Core B 7.9-9.1' dark brown/black, poorly sorted, well rounded SAND and GRAVEL, some gravel 3-4" diameter which did not go into sample jars. Core C 7-8.6' SAND and GRAVEL, PID 300+ at contact, 291 in S&G above in B Aquifer.	Strong Chemical Odor	
-12	9				9.1-11.9' wet, oxide orange brown to tan, gray at base, silty CLAY (B/C)		
-13	10						

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-25

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-14	10						
	11						
-15							
	12						
-16							
	13				13' End of boring		
-17							
	14						
-18							
	15						
-19							
	16						
-20							
	17						
-21							
	18						
-22							
	19						
-23							
	20						
-24							
	21						
-25							
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-25e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-09

Sheet 1 of 2

Date(s) Drilled	11/06/2017 - 11/06/2017	Logged By		Checked By	C.Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	13.5 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	11.4 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	5.4 feet
Location	N 316205.530 E 208608.770	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-5	0	6.1	0.1		0-1.6' very soft (sticky), saturated, dark brown black to green black, SILT (70%), little clay (25%), layer of sand and gravel (5%) at 1.5'; (modern DE River sediment)		0.0-0.5' Sample
		9.3					0.5-1.0' Sample (+PCB MS/MSD)
-6	1		0.1				
-7	2		0.1		1.6-1.9' loose, dark brown to gray, sub-rounded to rounded GRAVEL (90%), few sand (10%)		
					1.9-3.4' loose, wet, reddish brown to yellow brown, f-m SAND, trace gravel		
-8	3		0.1				
-9	4		0.1		3.4-4.6' loose, wet to saturated, yellowish brown to tan brown, f-m SAND (90%), few sub-rounded to rounded coarse gravel, trace coarse sand		
-10	5		0.1		4.6-4.9' loose, wet, brown to reddish brown, medium grained GRAVEL (80%), little m-c sand (20%),		
					4.9-6.0' wet, loose, brown to orange brown, SAND (60%), some sub-rounded to rounded gravel (40%) increasing concentration with depth		5.4-5.9' Sample
-11	6	0.05	0.1		6.0-6.6' loose, wet, gray to gray white with oxide orange, very fine SAND and SILT, very fine varves		
-12	7	0.5	0.1		6.6-6.8' wet to saturated, oxide orange and tan brown to gray, plastic, silty CLAY, very fine varves		6.6-6.8' Sample (Aquitard)
		0.12			6.8-7.4' loose, wet to saturated, gray to gray white with some oxide layers, fine SAND, some silt, trace mica		6.8-7.4' Sample (Sand)
-13	8		0.1		7.4-10.6' loose, wet, gray to white, very well sorted SAND, some micaceous silt, some oxide layers with coarse sand, small shells; (D Aquifer)		
-14	9		0.1				
	10						

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-09

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10		0.1				
		0.02			10.6-11.4' loose, wet, gray white to tan brown, SAND (80-85%), little rounded coarse gravel (15-20%), sharp contact above		
-16	11				11.4-13.5' Lost Recovery		
-17	12						
-18	13						
					End of Boring		
-19	14						
-20	15						
-21	16						
-22	17						
-23	18						
-24	19						
-25	20						
-26	21						
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-09e

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Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-10

Sheet 1 of 2

Date(s) Drilled	11/7/2017 - 11/7/2017	Logged By		Checked By	C.Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	12.8 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	12.2 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	5.3 feet
Location	N 316283.320 E 208648.520	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
	0		0		0-0.5' very soft, saturated, gray green to black, organic rich SILT, some shells; (modern DE River sediment)	Petroleum Odor	0.0-1.0' Sample
-5		3.6					
		39.1			0.5-1.0' loose, saturated, gray green to brownish green, SILT and fine SAND		0.5-1.0' Sample (MS/MSD)
	1				1.0-1.5' loose saturated, silty SAND grading down to sandy SILT, some mica present		
-6							
					1.5-3.1' loose, wet to saturated, gray to gray brown, sub-rounded to sub-angular poorly sorted GRAVEL (90-95%), few sand (5-10%)		
	2						
-7							
	3						
-8					3.1-4.1' loose, wet, oxide brown to orange brown, fine grading down to medium SAND, trace gravel		
	4						
-9					4.1-6.0' loose, wet to saturated, gray green brown to brown, poorly sorted SAND and sub-rounded GRAVEL		
	5		0				5.0-5.5' Sample
-10		0.05					
	6				6.0-6.4' loose, wet, dark brown to black, SAND and rounded GRAVEL, oxide present		60-6.5' Sample
-11		0.1			6.4-8.0' loose, wet, variegated reddish brown to orange brown, GRAVEL (75%), little sand (25%), sharp contact above		
	7						7.0-7.3' Sample
-12		0.6					
	8				8.0-8.5' loose, wet, brown, sub-angular to sub-rounded well sorted GRAVEL (95%), trace sand (5%)		
-13							
					8.5-8.8' stiff to hard, saturated, , highly oxidized orange to gray with fine layers, silty CLAY to clayey SILT, trace gravel at top of unit, erosional contact above		
	9		0		8.8-10.3' saturated, plastic, silty CLAY, some fine sand, trace gravel, trace white dropstones		
-14							
	10						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-10e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-10

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10		0		10.3-10.35' gray to strong oxide orange, very fine SAND, sharp erosional CONTACT		
					10.3-12.2' loose, wet, gray to gray white, silty fine SAND, some fine gravel, white dropstones, some mica present		
-16	11	0.06					11.0-11.3 Sample
	12						
-17					12.2'-12.8' Lost Recovery		
	13				End of Boring		
-18							
	14						
-19							
	15						
-20							
	16						
-21							
	17						
-22							
	18						
-23							
	19						
-24							
	20						
-25							
	21						
-26							
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-10e

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Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-11

Sheet 1 of 2

Date(s) Drilled	11/07/2017 - 11/07/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	13.0 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	11.8 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	3.5 feet
Location	N 316343.510 E 208695.970	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-5	0	3.4	0		0-1.0' soft, saturated, black to very dark black, organic rich SILT, oyster shells present; (modern DE River sediment)		0.0-0.5' Sample
		116.9					0.5-1.0' Sample
-6	1		0		1.0-1.6' soft, saturated, dark black to grayish black, silty CLAY to clayey SILT		
-7	2		0		1.6-4.0' loose, wet to saturated, brown, SAND and GRAVEL, sharp contact above		
-8	3		0				
-9	4		0		4.0-4.8' loose, wet, dark brown to reddish brown, sub-rounded to rounded GRAVEL (75%), little sand (25%)		
-10	5		0		4.8-5.2' loose, wet, strong oxide red to orange brown, m-f SAND, trace fine gravel at base		
		0.3			5.2-6.5' loose, wet, brown to reddish brown, poorly sorted SAND (75%), little rounded gravel (25%)		5.5-6.0' Sample
-11	6		0				
-12	7		0		6.5-6.8' loose, wet, strong orange brown to brown tan, SAND (85-90%), few sub-rounded to rounded gravel (10%), trace silt (<5%)		
		0.3			6.8-8.0' loose, wet, medium orange brown, SAND (90%), few fine gravel (10%), gravels increase concentration toward base		7.0-7.5 Sample (+Dup)
-13	8		0		8.0-8.5' loose, wet, oxide brown, well sorted SAND (90%), few fine gravel (10%) in layers		
-14	9		0		8.5-10.3' loose, wet, gray brown to reddish brown, m-c SAND (50%) and sub-angular to sub-rounded GRAVEL (50%)		
	10						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-11e

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Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-11

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10	0.2	0				10-10.3' Sample
		1.0	0.1		10.3-10.31' sharp CONTACT at 10.3'		10.3-10.5' Sample
-16	11		0		10.3-12' gray to oxide orange brown, very fine layers of gray towards bottom, varves, silty CLAY to clayey SILT, some lignite present		
-17	12				12-13' Lost Sample		
-18	13				End of Boring		
-19	14						
-20	15						
-21	16						
-22	17						
-23	18						
-24	19						
-25	20						
-26	21						
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-11e

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Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-12

Sheet 1 of 2

Date(s) Drilled	11/6/2017 - 11/6/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	12.5 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	11.7 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	8.8 feet
Location	N 316294.780 E 208751.450	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
	0	6.4			0-1.3' very soft, saturated, dark gray green to black, becomes gray green to brownish gray green at bottom, SILT to silty CLAY, slight sheen seen on water, slight odor of petroleum; (modern DE River sediment)	Slight Petroleum Odor	0.0-0.5' Sample
-5		9.1					0.5-1.0' Sample
	1						
-6			1.0		1.3-2.7' loose, wet, brown grading down to reddish brown, angular to sub-angular fine grading down to coarse SAND (50%) and rounded fine GRAVEL (50%)		
	2		1.0				
-7			1.2				
	3		2.4		2.7-2.9' loose, wet, medium brown above and reddish orange brown, m-c SAND, some silt, erosional contact above		
		0.7			2.9-3.8' loose, wet, reddish brown to brown, coarse sub-rounded to rounded coarse GRAVEL (75%), little coarse sand (25%)		3.2-3.7' Sample (+Dup)
-8			8.9				
	4		3.5		3.8-4.6' loose, wet, reddish brown to brown, m-c SAND (80%), little gravel (20%), black oxide nodules present		
-9			4.4		4.6-7.6' loose, wet to saturated, medium brown to orange brown, poorly sorted SAND (75%), little sub-angular to sub-rounded coarse gravel (25%)	Slight sweet odor	
	5		3.6				
-10			3.5				
	6		7.5				
		0.05					6.3-6.8' Sample
-11			6.8				
	7						
-12					7.6-7.8' loose, wet, orange brown, f-m SAND, little fine gravel		
	8				7.8-9.2' loose, wet, brown to medium brown, some orange oxide areas, SAND (75%), little gravel (25%), increased gravel concentration at base	Slight odor	
-13							8.6-9.1' Sample
	9	0.1					
		10.4	8-10		9.2-9.22 brick red, HARDPAN oxide layer		9.1-9.3' Sample (Aquitard)
-14					9.22-11.8' stiff, saturated, oxide orange brown and gray, varves, grading into gray with dark oxides, plastic, silty CLAY and CLAY, lots of lignite and wood from middle and bottom of unit;		
	10						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-12e

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Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-12

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10		5.5				
-16	11						
-17	12				11.8-12.5' Lost Recovery		
-18	13				End of Boring		
-19	14						
-20	15						
-21	16						
-22	17						
-23	18						
-24	19						
-25	20						
-26	21						
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-12e

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Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-13

Sheet 1 of 2

Date(s) Drilled	11/06/2017 - 11/06/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	12.5 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	11.5 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	7.7 feet
Location	N 316240.420 E 208709.120	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
	0		0-0.1		0-1.1' very soft, saturated, gray green to gray black, SILT; (modern DE River sediment)		0.0-0.5' Sample
		3.4					0.5-1.0' Sample
-5		4.1					
	1				1.1-1.6' very loose to loose, wet to saturated, dark brown to black, GRAVEL		
-6					1.6-2.4' loose, wet to saturated, brown to greenish brown, poorly sorted SAND, some sub-rounded to rounded f-m gravel		
	2						
-7					2.4-3.3' loose, wet, reddish brown, well sorted SAND (75%), little sub-rounded to rounded coarse gravel (25%)		
	3						
-8			0-0.2		3.3-4.1' loose, wet, reddish brown, well sorted SAND (50%) and sub-angular coarse GRAVEL (50%)		
	4						
-9		0.4			4.1-5.0' loose, wet, reddish brown to oxide orange brown and black, sub-rounded grading down to rounded GRAVEL (75%), increasing gravel size with depth, little coarse sand (25%), oxide layers		4.3-4.8' Sample
	5				5.0-6.8' loose, wet, oxide orange brown to strong brown, well sorted SAND (75%), little gravel (25%)		
-10							
	6						
-11		0.04					6.3-6.8' Sample
	7				6.8-6.85' sub-angular COBBLE, trace green silt, mica present		
-12					6.85-7.0' loose wet, orange brown, sub-angular to sub-rounded GRAVEL and SAND		
	8	0.05			7.0-7.3' loose, wet, strong orange brown, SAND (75%), little gravel (25%), trace silt (<5%)		
-13					7.3-9.2' loose, strong orange brown, SAND (50%) and rounded COBBLES (50%), increasing cobble concentration towards base		7.8-8.9' Sample (MS/MSD)
	9	4.8					8.9-9.1' Sample
-14			0.9		9.2-11.2' stiff, wet to saturated, oxide orange brown to strong orange to yellow brown, grading into dark brown to gray, plastic, CLAY to silty CLAY, white dropstones, mica present		
	10						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-13e

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Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-13

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10						
	11		0				
-16					11.2-12.5' Lost Recovery		
	12						
-17					End of Boring		
	13						
-18							
	14						
-19							
	15						
-20							
	16						
-21							
	17						
-22							
	18						
-23							
	19						
-24							
	20						
-25							
	21						
-26							
	22						

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-14

Sheet 1 of 2

Date(s) Drilled	11/1/2017 - 11/1/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	12.0 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	11.8 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	5.7 feet
Location	N 316238.710 E 208785.310	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-5	0	34.5			0-0.5' very soft, saturated, green gray to green to black, organic rich SILT, some fine sand, trace mica, some shells, some rootlets; (modern DE River sediment)		0.0-0.5' Sample
		38.8	0.3		0.5-1.0' soft, saturated, gray green to black, sandy SILT; (modern DE River sediment)		0.5-1.0' Sample (MS/MSD)
-6	1		50		1.0-1.6' med gray to light gray, m-c SAND, some fine sand, some fine gravel, sharp contact above		
	2				1.6-2.2' loose, wet, strong iron oxide orange brown, f-m SAND, little fine gravel, increasing gravel concentration with depth (up to 25%)		
-7	3				2.2-3.1' loose, wet, rounded coarse GRAVEL (75%), little sub-rounded m-c sand (25%)		
-8	4				3.1-3.7' loose wet, strong orange brown to brown, poorly sorted SAND (50%) and GRAVEL (50%), sharp contact above		
			<10		3.7-5.5' loose, wet, brownish green, f-m SAND, some coarse sand, trace mica,		4.5-5.0' Sample
-9	5	0.8	5.5				
-10	6	0.3			5.5-5.8' loose, strong orange brown, rounded coarse GRAVEL/COBBLE (80%), little fine sand (20%)		5.5-6.0' Sample
					5.8-7.8' loose, saturated, reddish brown to brown, sub-angular grading down to rounded coarse GRAVEL, some sand, cobbles at base		
-11	7		6.5				
-12	8		8				
-13	9	0.08	0		8.8-9.1' wet, strong oxide orange yellow color, loose SAND and GRAVEL, grading into stiff plastic silty CLAY,		8.5-9.0' Sample
		33.1			9.1-10.8' stiff, wet, oxide brown to orange tan with strong oxide red layers, varves, plastic, silty CLAY		9.0-9.5' Sample (Aquitard)
-14	10						

Report: DUPO..._ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-14e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-14

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10						
	11				10.8-11.8' stiff, orange transitions sharply to gray, clayey SILT to silty CLAY, top of unit has varves with very fine sand, lignite and rootlets present, wood throughout, becomes very sandy towards base, microfossils present, trace mica		
-16					11.8-12.0' Lost Recovery		
	12				End of Boring		
-17	13						
-18	14						
-19	15						
-20	16						
-21	17						
-22	18						
-23	19						
-24	20						
-25	21						
-26	22						

Project: DE River NAPL Delineation Phase III
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring E16-BOR-07

Sheet 1 of 1

Date(s) Drilled	11/03/2017 - 11/03/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	3.4 feet
Type of Boat / Barge	OSI Barge	Contractor	Ocean Surveys Inc.	Field Core Recovery	3.1 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	5.3 feet
Location	N 316389.510 E 209032.510	Sampling Method(s)	Liner- Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
0	0	44.6			0-0.5' very soft, saturated, dark gray green, SILT; (modern DE River sediment)	Petroleum odor. Slight sheen on water.	0.0-0.5' Sample
-4	4	30.1	0		0.5-1.0' loose, wet to saturated, dark gray brown, gray green brown, black, m-c SAND, some silt; (modern DE River sediment)		0.5-1.0' Sample
-1	1		0		1.0-1.5' loose, wet to saturated, green brown, SAND, some silt		
-5	5				1.5-1.6' strong orange brown, SAA		
-2	2		0		1.6-1.8' loose, wet, sub-rounded to rounded silty SAND, grading to coarse sand, oxide orange layer at base		
-6	6				1.8-3.1' loose, wet, orange brown, angular to sub-angular m-c SAND		
-3	3		0		3.1-3.4' Lost Recovery		
-7	7				End of Boring		
-4	4						
-8	8						
-5	5						
-9	9						
-6	6						
-10	10						
-7	7						
-11	11						
-8	8						
-12	12						
-9	9						
-13	13						
-10	10						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 E16-BOR-07e

AECOM

Project: DE River NAPL Delineation Phase III
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring E16-BOR-08

Sheet 1 of 1

Date(s) Drilled	10/31/2017 - 10/31/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	3.1 feet
Type of Boat / Barge	Candu Boat	Contractor	Ocean Surveys, Inc (OSI)	Field Core Recovery	2.7 feet
Surface Water Body	E16-DE River	Operators	Morgan Barrett	Surface Water Depth	3.1 feet
Location	N 316421.340 E 209035.650	Sampling Method(s)	Vibracore-Liner Continous Core	Sampling Crew	KWest/A.Dyroff/J.Gomes

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
	0	1.0	0		0-0.1' very soft, saturated, green brown, SILT; (modern DE River sediment)		Sampled 0-0.5"
-4	1	2.3	0		0.1-0.5' very soft to soft, medium gray brown to gray with some nodules of oxide orange color, wet to saturated, organic rich SILT, some clay, some clams, root material; (modern DE River sediment)		Sampled 0.5-1.0'
-5	2		0		0.5-2.5' soft, saturated, medium gray brown to gray, SILT, some clay, some layers of fine sand, sand concentration increasing with depth, some roots and other woody organic matter		
-6	3		0		2.5-3.1 Lost Recovery		
-7	4				End of Boring		
-8	5						
-9	6						
-10	7						
-11	8						
-12	9						
-13	10						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 E16-BOR-08e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-24

Sheet 1 of 2

Date(s) Drilled	11/1/2017 - 11/1/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	12.4 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	9.8 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	3.4 feet
Location	N 315925.390 E 208484.490	Sampling Method(s)	liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-4	0	1.2			0-0.2' very soft, saturated, medium gray to black, SILT; (modern DE River sediment)		Sampled 0.0-0.5
		58.6			0.2-1.0' loose, wet, gray and brown gray, sub-rounded f-m SAND		Sampled 0.5-1.0
-5	1		3.0		1.0-1.2' dark gray to black, fine SAND, a layer of silty clay	Slight Petroleum Odor	
					1.2-2.2' loose, saturated, brown, fine SAND		
-6	2		4.5		2.2-3.1' loose, wet to saturated, brown, angular fine grading down to coarse SAND (75%), little rounded coarse gravel (25%) at depth	Strong Petroleum Odor	
		0.2					Sampled 2.7-3.0'
-7	3		11.5		3.1-4.9' loose, wet, brown to brown orange, sub-angular to sub-rounded m-c SAND		
-8	4						
-9	5		30-45		4.9-5.1' soft, wet to saturated, dark gray to black, clayey SILT, trace red/orange oxide red/orange		Sampled 5.0-5.5'
		0.6			5.1-5.3' loose, wet, oxide brown, f-m SAND, sharp contact above		
					5.3-5.7' loose, wet, gray, sub-rounded SAND (70-80%), little rounded coarse gravel (10-20%)		
-10	6				5.7-6.2' loose, wet, dark gray, SAND (75%), little sub-rounded to rounded coarse gravel (25%), trace silt (<5%), cobble at bottom	Chemical Odor	Sampled 6.0-6.5'
		0.2			6.2-7.0' wet, gray to brown to oxide orange, plastic, silty CLAY, very fine sand layers, contact above	Chemical Odor	
-11	7	22.0	5+/20/55		7.0-7.2' wet to saturated, loose, dark brown black, angular m-c SAND (85%), few rounded gravel (10-15%), one cobble	Strong Chemical Odor.	Sampled 6.5-7.1 (clay)
		2.1	<20				7.0-7.2' Sample
		27.5 (D)			7.2-9.8' medium orange tan, brown, medium gray, tan, tan white, varves, CLAY (70%), little silt (30%), increasing clay concentration with depth, thin layer of oxide orange sand at base, sharp contact above		7.2-7.7' Sample (+Dup)
-12	8						
-13	9						
-14	10				9.8-12.4' Lost Recovery		

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-24e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-24

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-14	10						
-15	11						
-16	12						
-17	13				End of Boring		
-18	14						
-19	15						
-20	16						
-21	17						
-22	18						
-23	19						
-24	20						
-25	21						
-26	22						

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-25

Sheet 1 of 2

Date(s) Drilled	11/04/2017 - 11/04/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	13.0 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	11.9 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	7.8 feet
Location	N 315983.180 E 206668.170	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
0	0		NA		Core Not Opened 0-7.8 feet. Sample for Treatability only from bottom of B Aquifer. Core A=7.9-9.1' sampled, Core B=5.4-6.9' sampled, Core C=7.0-8.6' Sampled		
-4	1						
-5	2						
-6	3						
-7	4						
-8	5						
-9	6						
-10	7						
-11	8		100+		Core B 7.9-9.1' dark brown/black, poorly sorted, well rounded SAND and GRAVEL, some gravel 3-4" diameter which did not go into sample jars. Core C 7-8.6' SAND and GRAVEL, PID 300+ at contact, 291 in S&G above in B Aquifer.	Strong Chemical Odor	
-12	9				9.1-11.9' wet, oxide orange brown to tan, gray at base, silty CLAY (B/C)		
-13	10						

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-25

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-14	10						
	11						
-15							
	12						
-16							
	13				13' End of boring		
-17							
	14						
-18							
	15						
-19							
	16						
-20							
	17						
-21							
	18						
-22							
	19						
-23							
	20						
-24							
	21						
-25							
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-25e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-09

Sheet 1 of 2

Date(s) Drilled	11/06/2017 - 11/06/2017	Logged By		Checked By	C.Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	13.5 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	11.4 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	5.4 feet
Location	N 316205.530 E 208608.770	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
0	0		0.1				
-5	5	6.1			0-1.6' very soft (sticky), saturated, dark brown black to green black, SILT (70%), little clay (25%), layer of sand and gravel (5%) at 1.5'; (modern DE River sediment)		0.0-0.5' Sample
		9.3					0.5-1.0' Sample (+PCB MS/MSD)
-6	1		0.1				
	2				1.6-1.9' loose, dark brown to gray, sub-rounded to rounded GRAVEL (90%), few sand (10%)		
-7			0.1		1.9-3.4' loose, wet, reddish brown to yellow brown, f-m SAND, trace gravel		
	3						
-8			0.1				
	4				3.4-4.6' loose, wet to saturated, yellowish brown to tan brown, f-m SAND (90%), few sub-rounded to rounded coarse gravel, trace coarse sand		
-9			0.1				
	5				4.6-4.9' loose, wet, brown to reddish brown, medium grained GRAVEL (80%), little m-c sand (20%),		
-10			0.1		4.9-6.0' wet, loose, brown to orange brown, SAND (60%), some sub-rounded to rounded gravel (40%) increasing concentration with depth		
		0.05					5.4-5.9' Sample
	6		0.1		6.0-6.6' loose, wet, gray to gray white with oxide orange, very fine SAND and SILT, very fine varves		
-11							
		0.5			6.6-6.8' wet to saturated, oxide orange and tan brown to gray, plastic, silty CLAY, very fine varves		6.6-6.8' Sample (Aquitard)
	7		0.1		6.8-7.4' loose, wet to saturated, gray to gray white with some oxide layers, fine SAND, some silt, trace mica		6.8-7.4' Sample (Sand)
-12		0.12					
					7.4-10.6' loose, wet, gray to white, very well sorted SAND, some micaceous silt, some oxide layers with coarse sand, small shells; (D Aquifer)		
-13	8		0.1				
	9						
-14			0.1				
	10						

Report: DUPON..._ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-09e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-09

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10		0.1				
-16	11	0.02			10.6-11.4' loose, wet, gray white to tan brown, SAND (80-85%), little rounded coarse gravel (15-20%), sharp contact above		
					11.4-13.5' Lost Recovery		
-17	12						
-18	13						
-19	14				End of Boring		
-20	15						
-21	16						
-22	17						
-23	18						
-24	19						
-25	20						
-26	21						
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-09e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-10

Sheet 1 of 2

Date(s) Drilled	11/7/2017 - 11/7/2017	Logged By		Checked By	C.Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	12.8 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	12.2 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	5.3 feet
Location	N 316283.320 E 208648.520	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
	0		0				
-5		3.6			0-0.5' very soft, saturated, gray green to black, organic rich SILT, some shells; (modern DE River sediment)	Petroleum Odor	0.0-1.0' Sample
		39.1			0.5-1.0' loose, saturated, gray green to brownish green, SILT and fine SAND		0.5-1.0' Sample (MS/MSD)
	1				1.0-1.5' loose saturated, silty SAND grading down to sandy SILT, some mica present		
-6					1.5-3.1' loose, wet to saturated, gray to gray brown, sub-rounded to sub-angular poorly sorted GRAVEL (90-95%), few sand (5-10%)		
	2						
-7							
	3						
-8					3.1-4.1' loose, wet, oxide brown to orange brown, fine grading down to medium SAND, trace gravel		
	4						
-9					4.1-6.0' loose, wet to saturated, gray green brown to brown, poorly sorted SAND and sub-rounded GRAVEL		
	5		0				
-10		0.05					5.0-5.5' Sample
	6				6.0-6.4' loose, wet, dark brown to black, SAND and rounded GRAVEL, oxide present		60-6.5' Sample
-11		0.1			6.4-8.0' loose, wet, variegated reddish brown to orange brown, GRAVEL (75%), little sand (25%), sharp contact above		
	7						7.0-7.3' Sample
-12		0.6					
	8				8.0-8.5' loose, wet, brown, sub-angular to sub-rounded well sorted GRAVEL (95%), trace sand (5%)		
-13					8.5-8.8' stiff to hard, saturated, , highly oxidized orange to gray with fine layers, silty CLAY to clayey SILT, trace gravel at top of unit, erosional contact above		
	9		0		8.8-10.3' saturated, plastic, silty CLAY, some fine sand, trace gravel, trace white dropstones		
-14							
	10						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-10e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-10

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10		0		10.3-10.35' gray to strong oxide orange, very fine SAND, sharp erosional CONTACT		
-16	11	0.06			10.3-12.2' loose, wet, gray to gray white, silty fine SAND, some fine gravel, white dropstones, some mica present		11.0-11.3 Sample
-17	12				12.2'-12.8' Lost Recovery		
-18	13				End of Boring		
-19	14						
-20	15						
-21	16						
-22	17						
-23	18						
-24	19						
-25	20						
-26	21						
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-10e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-11

Sheet 1 of 2

Date(s) Drilled	11/07/2017 - 11/07/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	13.0 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	11.8 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	3.5 feet
Location	N 316343.510 E 208695.970	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-5	0	3.4	0		0-1.0' soft, saturated, black to very dark black, organic rich SILT, oyster shells present; (modern DE River sediment)		0.0-0.5' Sample
		116.9					0.5-1.0' Sample
-6	1		0		1.0-1.6' soft, saturated, dark black to grayish black, silty CLAY to clayey SILT		
-7	2		0		1.6-4.0' loose, wet to saturated, brown, SAND and GRAVEL, sharp contact above		
-8	3		0				
-9	4		0		4.0-4.8' loose, wet, dark brown to reddish brown, sub-rounded to rounded GRAVEL (75%), little sand (25%)		
-10	5		0		4.8-5.2' loose, wet, strong oxide red to orange brown, m-f SAND, trace fine gravel at base		
		0.3			5.2-6.5' loose, wet, brown to reddish brown, poorly sorted SAND (75%), little rounded gravel (25%)		5.5-6.0' Sample
-11	6		0				
-12	7	0.3	0		6.5-6.8' loose, wet, strong orange brown to brown tan, SAND (85-90%), few sub-rounded to rounded gravel (10%), trace silt (<5%)		
					6.8-8.0' loose, wet, medium orange brown, SAND (90%), few fine gravel (10%), gravels increase concentration toward base		7.0-7.5 Sample (+Dup)
-13	8		0		8.0-8.5' loose, wet, oxide brown, well sorted SAND (90%), few fine gravel (10%) in layers		
-14	9		0		8.5-10.3' loose, wet, gray brown to reddish brown, m-c SAND (50%) and sub-angular to sub-rounded GRAVEL (50%)		
	10						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-11e

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-11

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10	0.2	0				10-10.3' Sample
		1.0	0.1		10.3-10.31' sharp CONTACT at 10.3'		10.3-10.5' Sample
-16	11		0		10.3-12' gray to oxide orange brown, very fine layers of gray towards bottom, varves, silty CLAY to clayey SILT, some lignite present		
-17	12				12-13' Lost Sample		
-18	13				End of Boring		
-19	14						
-20	15						
-21	16						
-22	17						
-23	18						
-24	19						
-25	20						
-26	21						
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-11e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-12

Sheet 1 of 2

Date(s) Drilled	11/6/2017 - 11/6/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	12.5 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	11.7 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	8.8 feet
Location	N 316294.780 E 208751.450	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
	0	6.4			0-1.3' very soft, saturated, dark gray green to black, becomes gray green to brownish gray green at bottom, SILT to silty CLAY, slight sheen seen on water, slight odor of petroleum; (modern DE River sediment)	Slight Petroleum Odor	0.0-0.5' Sample
-5		9.1					0.5-1.0' Sample
	1						
-6			1.0		1.3-2.7' loose, wet, brown grading down to reddish brown, angular to sub-angular fine grading down to coarse SAND (50%) and rounded fine GRAVEL (50%)		
	2		1.0				
-7			1.2				
	3		2.4		2.7-2.9' loose, wet, medium brown above and reddish orange brown, m-c SAND, some silt, erosional contact above		
		0.7			2.9-3.8' loose, wet, reddish brown to brown, coarse sub-rounded to rounded coarse GRAVEL (75%), little coarse sand (25%)		3.2-3.7' Sample (+Dup)
-8			8.9				
	4		3.5		3.8-4.6' loose, wet, reddish brown to brown, m-c SAND (80%), little gravel (20%), black oxide nodules present		
-9			4.4		4.6-7.6' loose, wet to saturated, medium brown to orange brown, poorly sorted SAND (75%), little sub-angular to sub-rounded coarse gravel (25%)	Slight sweet odor	
	5		3.6				
-10			3.5				
	6		7.5				
		0.05					6.3-6.8' Sample
-11			6.8				
	7						
-12					7.6-7.8' loose, wet, orange brown, f-m SAND, little fine gravel		
	8				7.8-9.2' loose, wet, brown to medium brown, some orange oxide areas, SAND (75%), little gravel (25%), increased gravel concentration at base	Slight odor	
-13							8.6-9.1' Sample
	9	0.1					
		10.4	8-10		9.2-9.22 brick red, HARDPAN oxide layer		9.1-9.3' Sample (Aquitard)
-14					9.22-11.8' stiff, saturated, oxide orange brown and gray, varves, grading into gray with dark oxides, plastic, silty CLAY and CLAY, lots of lignite and wood from middle and bottom of unit;		
	10						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-12e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-12

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10		5.5				
-16	11						
-17	12				11.8-12.5' Lost Recovery		
-18	13				End of Boring		
-19	14						
-20	15						
-21	16						
-22	17						
-23	18						
-24	19						
-25	20						
-26	21						
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-12e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-13

Sheet 1 of 2

Date(s) Drilled	11/06/2017 - 11/06/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	12.5 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	11.5 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	7.7 feet
Location	N 316240.420 E 208709.120	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
0	0		0-0.1				
		3.4			0-1.1' very soft, saturated, gray green to gray black, SILT; (modern DE River sediment)		0.0-0.5' Sample
-5		4.1					0.5-1.0' Sample
	1				1.1-1.6' very loose to loose, wet to saturated, dark brown to black, GRAVEL		
-6					1.6-2.4' loose, wet to saturated, brown to greenish brown, poorly sorted SAND, some sub-rounded to rounded f-m gravel		
	2						
-7					2.4-3.3' loose, wet, reddish brown, well sorted SAND (75%), little sub-rounded to rounded coarse gravel (25%)		
	3						
-8			0-0.2		3.3-4.1' loose, wet, reddish brown, well sorted SAND (50%) and sub-angular coarse GRAVEL (50%)		
	4						
-9		0.4			4.1-5.0' loose, wet, reddish brown to oxide orange brown and black, sub-rounded grading down to rounded GRAVEL (75%), increasing gravel size with depth, little coarse sand (25%), oxide layers		4.3-4.8' Sample
	5				5.0-6.8' loose, wet, oxide orange brown to strong brown, well sorted SAND (75%), little gravel (25%)		
-10							
	6						
-11		0.04					6.3-6.8' Sample
	7				6.8-6.85' sub-angular COBBLE, trace green silt, mica present		
					6.85-7.0' loose wet, orange brown, sub-angular to sub-rounded GRAVEL and SAND		
-12					7.0-7.3' loose, wet, strong orange brown, SAND (75%), little gravel (25%), trace silt (<5%)		
	8	0.05			7.3-9.2' loose, strong orange brown, SAND (50%) and rounded COBBLES (50%), increasing cobble concentration towards base		7.8-8.9' Sample (MS/MSD)
-13							
	9	4.8					8.9-9.1' Sample
-14			0.9		9.2-11.2' stiff, wet to saturated, oxide orange brown to strong orange to yellow brown, grading into dark brown to gray, plastic, CLAY to silty CLAY, white dropstones, mica present		
	10						

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-13

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10		0				
	11						
-16					11.2-12.5' Lost Recovery		
	12						
-17					End of Boring		
	13						
-18							
	14						
-19							
	15						
-20							
	16						
-21							
	17						
-22							
	18						
-23							
	19						
-24							
	20						
-25							
	21						
-26							
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-13e

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Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-14

Sheet 1 of 2

Date(s) Drilled	11/1/2017 - 11/1/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	12.0 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	11.8 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	5.7 feet
Location	N 316238.710 E 208785.310	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
0	0	34.5			0-0.5' very soft, saturated, green gray to green to black, organic rich SILT, some fine sand, trace mica, some shells, some rootlets; (modern DE River sediment)		0.0-0.5' Sample
-5	1	38.8	0.3		0.5-1.0' soft, saturated, gray green to black, sandy SILT; (modern DE River sediment)		0.5-1.0' Sample (MS/MSD)
			50		1.0-1.6' med gray to light gray, m-c SAND, some fine sand, some fine gravel, sharp contact above		
-6	2				1.6-2.2' loose, wet, strong iron oxide orange brown, f-m SAND, little fine gravel, increasing gravel concentration with depth (up to 25%)		
-7	3				2.2-3.1' loose, wet, rounded coarse GRAVEL (75%), little sub-rounded m-c sand (25%)		
					3.1-3.7' loose wet, strong orange brown to brown, poorly sorted SAND (50%) and GRAVEL (50%), sharp contact above		
-8	4		<10		3.7-5.5' loose, wet, brownish green, f-m SAND, some coarse sand, trace mica,		
-9	5	0.8	5.5				4.5-5.0' Sample
-10	6	0.3			5.5-5.8' loose, strong orange brown, rounded coarse GRAVEL/COBBLE (80%), little fine sand (20%)		5.5-6.0' Sample
					5.8-7.8' loose, saturated, reddish brown to brown, sub-angular grading down to rounded coarse GRAVEL, some sand, cobbles at base		
-11	7		6.5				
-12	8		8				
-13	9	0.08					8.5-9.0' Sample
			0		8.8-9.1' wet, strong oxide orange yellow color, loose SAND and GRAVEL, grading into stiff plastic silty CLAY,		
		33.1			9.1-10.8' stiff, wet, oxide brown to orange tan with strong oxide red layers, varves, plastic, silty CLAY		9.0-9.5' Sample (Aquitard)
-14	10						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-14e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-14

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10						
	11				10.8-11.8' stiff, orange transitions sharply to gray, clayey SILT to silty CLAY, top of unit has varves with very fine sand, lignite and rootlets present, wood throughout, becomes very sandy towards base, microfossils present, trace mica		
-16	12				11.8-12.0' Lost Recovery End of Boring		
-17	13						
-18	14						
-19	15						
-20	16						
-21	17						
-22	18						
-23	19						
-24	20						
-25	21						
-26	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-14e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-21

Sheet 1 of 2

Date(s) Drilled	11/4/2017 - 11/4/2017	Logged By		Checked By	C.Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	13.0 feet
Type of Boat / Barge	OSI Barge	Contractor	Ocean Surveys Inc.	Field Core Recovery	10.6 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	5.3 feet
Location	N 316176.710 E 208667.290	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
	0	1.7			0-0.5' very soft, saturated, black to gray green, organic rich SILT, sticks/wood, a layer of oyster shells; (modern DE River sediment)		0.0-0.5' Sample
-5		2.3			0.5-1.0' very soft (sticky), saturated, dark gray green to black, silty CLAY, shells throughout interval	Strong petroleum odor.	0.5-1.0' Sample
	1				1.0-2.3' medium dense, variegated brown to reddish, greenish brown, m-c SAND (85-90%), few gravel (10%), trace silt		
-6							
	2		0.1		2.0-2.4' loose, wet, orange brown, SAND, trace micaceous silt, oxide bands present; (could be weathered Wissahickon Schist)		
-7			0.1		2.4-2.6' loose, wet, brown to orange brown, sub-rounded to rounded coarse GRAVEL/COBBLES (75%), little sand (25%), sharp contact above		
	3				2.6-2.8' dark brown to gray brown, SAA		
			2.1		2.8-3.6' loose, wet, brownish green to greenish brown, tan , SAND (80%), little gravel (20%)		
-8			2.4		3.6-3.8' loose but lightly cemented, wet, strong orange brown to brick red, hardpan layers of f-m SAND, layers of coarse sand, oxide coating on quartz		
	4		4.8		3.8-4.7' loose, wet, greenish brown to gray brown with orange, SAND (75-80%), little rounded medium gravel (15-20%), trace micaceous silt, oxide layering, slight odor	Slight odor	
-9		0.08	1.2		4.7-5.3' loose, wet, brown to strong brown, SAND, some coarse gravel		4.5-5.0' Sample
	5						
-10			3.2		5.3-6.6' loose, wet, brown to medium brown, f-m SAND (90%), few gravel (5-10%), trace micaceous silt, 0.5" thick layer of fine gravel near base of unit		
	6		3.2				6.0-6.5' Sample (MS/MSD)
-11		2.2	10.8		6.6-6.8' loose, wet, medium brown, f-m SAND,		
			31.4		6.8-8.0' loose, wet, brown to reddish brown, fine grading down to coarse GRAVEL (75%), little coarse sand (25%), erosional contact above	Chemical odor at base	
-12	7		20.9				
			3.2				7.8-8.0' Sample
	8	0.4					
-13		11.2	0.7		8.0-8.2' wet, strong orange brown to tan, plastic, CLAY (70%), little silt (30%) hardpan, some oxide present, erosional contact above		8.0-8.3' Sample (Aquitard)
	9		1.4		8.21-10.3' stiff, wet, gray to dark gray to black gray, plastic, silty CLAY, very thin layers of vf-f sand, trace white rounded dropstones, some varves, very sharp contact above.		
			0.4				
-14			0.7				
	10						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-21e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-21

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10		1.2		10.3-10.6' very stiff, wet to saturated, light gray to gray, silty CLAY grading down to silty fine SAND, trace mica		
					10.6-13.0' Lost Recovery		
-16	11						
-17	12						
-18	13				End of Boring		
-19	14						
-20	15						
-21	16						
-22	17						
-23	18						
-24	19						
-25	20						
-26	21						
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-21e

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Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-22

Sheet 1 of 2

Date(s) Drilled	11/3/2017 - 11/03/2017	Logged By		Checked By	C.Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	13.4 feet
Type of Boat / Barge	OSI Barge	Contractor	Ocean Surveys Inc.	Field Core Recovery	12.6 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	8.0 feet
Location	N 316149.010 E 208717.680	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
	0		0		0-0.5' very soft, saturated, gray green, SILT, some sticks; (modern DE River sediment)	Strong petroleum odor	0.0-0.5' Sample
-5		6.8	1.8		0.5-1.0' loose becoming more dense with depth, wet, dark gray, poorly sorted SAND (85-90%), few silt (10%), trace coarse gravel	Strong petroleum odor.	0.5-1.0' Sample
	1	0.4	9.3		1.0-3.6' brown to reddish brown, SAND (85-90%), few silt (10%), trace sub-rounded to rounded gravel, mica present	Odor	
-6							
	2		2.6				2.0-2.5' Sample
-7		1.1					
	3		0				
-8					3.6-5.5' loose, wet, reddish brown to brown, SAND, trace silt, <1" thick layers of coarse sand, red oxide layering		
	4		10.2				
-9			8.8				
	5		15.9				
-10			1.2		5.5-7.3' loose, wet, medium brown to brown, m-c SAND and sub-rounded to rounded fine GRAVEL	Strong chemical odor.	
	6		49.7				
-11			94.4				
	7		151				7.0-7.5' Sample
		0.2			7.3-7.6' wet to saturated, burgandy color, weathered siltstone COBBLES	Strong chemical odor.	
-12			50.5		7.6-8.0' loose, wet to saturated, brown to orange brown, m-c SAND, trace silt		
	8	7.8					7.8-8.0' Sample
		12.3	91		8.0-8.2' hard, wet to saturated, strong oxide red brown, hardpan SAND		8.0-8.2' Sample (+DUP) 8.0-8.5' Metals
-13					8.2-8.6' wet to saturated, strong orange to tan brown, plastic, clayey SILT, oxide layering, some black oxide nodules		
	9				8.6-9.6' moist to wet, gradual color change from oxide orange to tan brown, plastic, silty CLAY, few very fine sand, sandy orange oxide layers		
-14			36		9.6-10.0' stiff, wet, dark gray to gray brown, plastic, CLAY and SILT, trace fine gravel,		
	10						

Report: DUPO... _ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-22e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-22

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10		25.9		trace mica, microfossils present, trace white rounded dropstones, gradual contact above.		
					10.0-12.6' loose, wet to saturated, light tan to white tan, f-m SAND, trace rounded fine gravel, some orange oxide nodules, sharp contact above		
-16	11		16.3				
			4.6				
-17	12		10.3				
			0		12.6-13.4' Lost Recovery		
-18	13		17.3		End of Boring		
-19	14						
-20	15						
-21	16						
-22	17						
-23	18						
-24	19						
-25	20						
-26	21						
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-22e

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-23

Sheet 1 of 2

Date(s) Drilled	11/3/2017 - 11/3/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	13.0 feet
Type of Boat / Barge	OSI Barge	Contractor	Ocean Surveys Inc.	Field Core Recovery	11.8 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	7.3 feet
Location	N 316202.470 E 208737.410	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	Sum Organics, - mg/kg	PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
	0	126.6			0-0.5' very soft, saturated, gray green, SILT; (modern DE River sediment)	Strong petroleum odor	0-0.5 Sample (+Dup)
-5		42.2			0.5-1.0' soft becoming more stiff with depth, wet to saturated, medium to dark gray green, SILT, some f-m sand, increasing sand concentration with depth, trace mica	Strong petroleum odor. Sheen on water.	0.5-1.0' Sample
	1		10.5		1.0-2.3' wet, loose, dark gray to brown gray, becomes reddish brown with depth, m-c SAND (75%), little angular to sub-angular fine gravel (25%)		
-6			45				
			35				
	2		36				
-7			40		2.3-2.5' loose, wet, tan brown to gray brown, varves, very fine SAND, trace silt, sandy orange brown oxide layer at base		
	3		58		2.5-3.75' loose, wet to saturated, reddish brown, poorly sorted m-c SAND (75%), little sub-angular to sub-rounded f-m gravel (25%)		3.0-3.5 Sample
-8		0.32	33				
	4				3.75-4.1' loose, wet to saturated, strong orange brown to yellow brown, coarse SAND (90-95%), few angular gravel (5-10%)		
-9			168		4.2-4.8' loose, medium to strong orange brown, SAND and coarse GRAVEL		
	5		63.8		4.8-5.0' loose, wet to saturated, tan with some oxide orange at base, very fine SAND, some silt		5.0-6.0 Sample
-10		0.03			5.0-5.8' loose, wet to saturated, strong orange brown to brown, well sorted SAND, sharp contact above		
	6		170.3		5.8-6.0' loose, wet to saturated, tan to brown tan, f-m SAND, little coarse sand, trace rounded gravel		
-11			152				
	7				6.8-7.5' loose, wet to saturated, brown grading into brown orange at base, m-c SAND, some sub-rounded to rounded gravel		
-12			116.4				
	8		38.2		7.75-8.75' loose, wet to saturated, dark brown to gray brown, SAND (75%), little sub-rounded to rounded gravel (25%)	Strong Chemical odor	8-8.5' Sample
-13		0.23	152				
	9		116.4		8.75-9.2' dark brown to gray brown, SAA, orange oxide present on gravel	Chemical Odor	
			38				
			201				
			86.3				
-14					9.2-9.21' sharp erosional contact		9.5-9.7 Sample (Top Aquitard)
	10	13.22	18.8		9.21-10.8' wet to saturated, strong tan orange oxide, color change from oxide orange to gray at 9.75', very fine sandy SILT, increasing sand concentration with depth, some varves top, oxide sand at base		

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-23e

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Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-23

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10		5.1				
			15.5				
-16	11				10.8-11.8' medium stiff increasing to very stiff with depth, wet to saturated, dark gray, plastic, silty CLAY		
-17	12		0.0		11.8-13.0' Lost Recovery		
-18	13				End of Boring		
-19	14						
-20	15						
-21	16						
-22	17						
-23	18						
-24	19						
-25	20						
-26	21						
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-23e

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Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-24

Sheet 1 of 2

Date(s) Drilled	11/1/2017 - 11/1/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	12.4 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	9.8 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	3.4 feet
Location	N 315925.390 E 208484.490	Sampling Method(s)	liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	Sum Organics, - mg/kg	PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-4	0	1.2			0-0.2' very soft, saturated, medium gray to black, SILT; (modern DE River sediment)		Sampled 0.0-0.5
		58.6			0.2-1.0' loose, wet, gray and brown gray, sub-rounded f-m SAND		Sampled 0.5-1.0
-5	1		3.0		1.0-1.2' dark gray to black, fine SAND, a layer of silty clay	Slight Petroleum Odor	
					1.2-2.2' loose, saturated, brown, fine SAND		
-6	2		4.5		2.2-3.1' loose, wet to saturated, brown, angular fine grading down to coarse SAND (75%), little rounded coarse gravel (25%) at depth	Strong Petroleum Odor	
		0.2					Sampled 2.7-3.0'
-7	3		11.5		3.1-4.9' loose, wet, brown to brown orange, sub-angular to sub-rounded m-c SAND		
-8	4						
-9	5		30-45		4.9-5.1' soft, wet to saturated, dark gray to black, clayey SILT, trace red/orange oxide red/orange		Sampled 5.0-5.5'
		0.6			5.1-5.3' loose, wet, oxide brown, f-m SAND, sharp contact above		
					5.3-5.7' loose, wet, gray, sub-rounded SAND (70-80%), little rounded coarse gravel (10-20%)		
-10	6				5.7-6.2' loose, wet, dark gray, SAND (75%), little sub-rounded to rounded coarse gravel (25%), trace silt (<5%), cobble at bottom	Chemical Odor	Sampled 6.0-6.5'
		0.2			6.2-7.0' wet, gray to brown to oxide orange, plastic, silty CLAY, very fine sand layers, contact above	Chemical Odor	
-11	7	22.0	5+/20/55		7.0-7.2' wet to saturated, loose, dark brown black, angular m-c SAND (85%), few rounded gravel (10-15%), one cobble	Strong Chemical Odor.	Sampled 6.5-7.1 (clay)
		2.1	<20				7.0-7.2' Sample
		27.5 (D)			7.2-9.8' medium orange tan, brown, medium gray, tan, tan white, varves, CLAY (70%), little silt (30%), increasing clay concentration with depth, thin layer of oxide orange sand at base, sharp contact above		7.2-7.7' Sample (+Dup)
-12	8						
-13	9						
-14	10				9.8-12.4' Lost Recovery		

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-24e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-24

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-14	10						
-15	11						
-16	12						
-17	13				End of Boring		
-18	14						
-19	15						
-20	16						
-21	17						
-22	18						
-23	19						
-24	20						
-25	21						
-26	22						

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-25

Sheet 1 of 2

Date(s) Drilled	11/04/2017 - 11/04/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	13.0 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	11.9 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	7.8 feet
Location	N 315983.180 E 206668.170	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
	0		NA		Core Not Opened 0-7.8 feet. Sample for Treatability only from bottom of B Aquifer. Core A=7.9-9.1' sampled, Core B=5.4-6.9' sampled, Core C=7.0-8.6' Sampled		
-4	1						
-5	2						
-6	3						
-7	4						
-8	5						
-9	6						
-10	7						
-11	8		100+		Core B 7.9-9.1' dark brown/black, poorly sorted, well rounded SAND and GRAVEL, some gravel 3-4" diameter which did not go into sample jars. Core C 7-8.6' SAND and GRAVEL, PID 300+ at contact, 291 in S&G above in B Aquifer.	Strong Chemical Odor	
-12	9				9.1-11.9' wet, oxide orange brown to tan, gray at base, silty CLAY (B/C)		
-13	10						

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-25

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-14	10						
	11						
-15							
	12						
-16							
	13				13' End of boring		
-17							
	14						
-18							
	15						
-19							
	16						
-20							
	17						
-21							
	18						
-22							
	19						
-23							
	20						
-24							
	21						
-25							
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-25e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-09

Sheet 1 of 2

Date(s) Drilled	11/06/2017 - 11/06/2017	Logged By		Checked By	C.Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	13.5 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	11.4 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	5.4 feet
Location	N 316205.530 E 208608.770	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-5	0	6.1	0.1		0-1.6' very soft (sticky), saturated, dark brown black to green black, SILT (70%), little clay (25%), layer of sand and gravel (5%) at 1.5'; (modern DE River sediment)		0.0-0.5' Sample
		9.3					0.5-1.0' Sample (+PCB MS/MSD)
-6	1		0.1				
					1.6-1.9' loose, dark brown to gray, sub-rounded to rounded GRAVEL (90%), few sand (10%)		
-7	2		0.1		1.9-3.4' loose, wet, reddish brown to yellow brown, f-m SAND, trace gravel		
-8	3		0.1				
					3.4-4.6' loose, wet to saturated, yellowish brown to tan brown, f-m SAND (90%), few sub-rounded to rounded coarse gravel, trace coarse sand		
-9	4		0.1				
					4.6-4.9' loose, wet, brown to reddish brown, medium grained GRAVEL (80%), little m-c sand (20%),		
-10	5		0.1		4.9-6.0' wet, loose, brown to orange brown, SAND (60%), some sub-rounded to rounded gravel (40%) increasing concentration with depth		
		0.05					5.4-5.9' Sample
-11	6		0.1		6.0-6.6' loose, wet, gray to gray white with oxide orange, very fine SAND and SILT, very fine varves		
		0.5			6.6-6.8' wet to saturated, oxide orange and tan brown to gray, plastic, silty CLAY, very fine varves		6.6-6.8' Sample (Aquitard)
-12	7	0.12	0.1		6.8-7.4' loose, wet to saturated, gray to gray white with some oxide layers, fine SAND, some silt, trace mica		6.8-7.4' Sample (Sand)
-13	8		0.1		7.4-10.6' loose, wet, gray to white, very well sorted SAND, some micaceous silt, some oxide layers with coarse sand, small shells; (D Aquifer)		
-14	9		0.1				
	10						

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-09

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10		0.1				
		0.02			10.6-11.4' loose, wet, gray white to tan brown, SAND (80-85%), little rounded coarse gravel (15-20%), sharp contact above		
-16	11				11.4-13.5' Lost Recovery		
	12						
-17							
	13						
-18					End of Boring		
	14						
-19							
	15						
-20							
	16						
-21							
	17						
-22							
	18						
-23							
	19						
-24							
	20						
-25							
	21						
-26							
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-09e

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Project: DE River NAPL Delineation Phase 3 Project Location: Deepwater, NJ Project Number: 60485202.17001	Log of Boring D16-BOR-10 Sheet 1 of 2

Date(s) Drilled	11/7/2017 - 11/7/2017	Logged By		Checked By	C.Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	12.8 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	12.2 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	5.3 feet
Location	N 316283.320 E 208648.520	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-5	0	3.6	0		0-0.5' very soft, saturated, gray green to black, organic rich SILT, some shells; (modern DE River sediment)	Petroleum Odor	0.0-1.0' Sample
		39.1			0.5-1.0' loose, saturated, gray green to brownish green, SILT and fine SAND		0.5-1.0' Sample (MS/MSD)
-6	1				1.0-1.5' loose saturated, silty SAND grading down to sandy SILT, some mica present		
-7	2				1.5-3.1' loose, wet to saturated, gray to gray brown, sub-rounded to sub-angular poorly sorted GRAVEL (90-95%), few sand (5-10%)		
-8	3				3.1-4.1' loose, wet, oxide brown to orange brown, fine grading down to medium SAND, trace gravel		
-9	4				4.1-6.0' loose, wet to saturated, gray green brown to brown, poorly sorted SAND and sub-rounded GRAVEL		
-10	5	0.05	0				5.0-5.5' Sample
-11	6	0.1			6.0-6.4' loose, wet, dark brown to black, SAND and rounded GRAVEL, oxide present		60-6.5' Sample
-12	7	0.6			6.4-8.0' loose, wet, variegated reddish brown to orange brown, GRAVEL (75%), little sand (25%), sharp contact above		7.0-7.3' Sample
-13	8				8.0-8.5' loose, wet, brown, sub-angular to sub-rounded well sorted GRAVEL (95%), trace sand (5%)		
-14	9		0		8.5-8.8' stiff to hard, saturated, , highly oxidized orange to gray with fine layers, silty CLAY to clayey SILT, trace gravel at top of unit, erosional contact above 8.8-10.3' saturated, plastic, silty CLAY, some fine sand, trace gravel, trace white dropstones		
	10						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-10e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-10

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10		0		10.3-10.35' gray to strong oxide orange, very fine SAND, sharp erosional CONTACT		
-16	11	0.06			10.3-12.2' loose, wet, gray to gray white, silty fine SAND, some fine gravel, white dropstones, some mica present		11.0-11.3 Sample
-17	12				12.2'-12.8' Lost Recovery		
-18	13				End of Boring		
-19	14						
-20	15						
-21	16						
-22	17						
-23	18						
-24	19						
-25	20						
-26	21						
	22						

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-11

Sheet 1 of 2

Date(s) Drilled	11/07/2017 - 11/07/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	13.0 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	11.8 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	3.5 feet
Location	N 316343.510 E 208695.970	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-5	0	3.4	0		0-1.0' soft, saturated, black to very dark black, organic rich SILT, oyster shells present; (modern DE River sediment)		0.0-0.5' Sample
		116.9					0.5-1.0' Sample
-6	1		0		1.0-1.6' soft, saturated, dark black to grayish black, silty CLAY to clayey SILT		
-7	2		0		1.6-4.0' loose, wet to saturated, brown, SAND and GRAVEL, sharp contact above		
-8	3		0				
-9	4		0		4.0-4.8' loose, wet, dark brown to reddish brown, sub-rounded to rounded GRAVEL (75%), little sand (25%)		
-10	5		0		4.8-5.2' loose, wet, strong oxide red to orange brown, m-f SAND, trace fine gravel at base		
		0.3			5.2-6.5' loose, wet, brown to reddish brown, poorly sorted SAND (75%), little rounded gravel (25%)		5.5-6.0' Sample
-11	6		0				
-12	7		0		6.5-6.8' loose, wet, strong orange brown to brown tan, SAND (85-90%), few sub-rounded to rounded gravel (10%), trace silt (<5%)		
		0.3			6.8-8.0' loose, wet, medium orange brown, SAND (90%), few fine gravel (10%), gravels increase concentration toward base		7.0-7.5 Sample (+Dup)
-13	8		0		8.0-8.5' loose, wet, oxide brown, well sorted SAND (90%), few fine gravel (10%) in layers		
-14	9		0		8.5-10.3' loose, wet, gray brown to reddish brown, m-c SAND (50%) and sub-angular to sub-rounded GRAVEL (50%)		
	10						

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Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-11

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10	0.2	0				10-10.3' Sample
		1.0	0.1		10.3-10.31' sharp CONTACT at 10.3'		10.3-10.5' Sample
-16	11		0		10.3-12' gray to oxide orange brown, very fine layers of gray towards bottom, varves, silty CLAY to clayey SILT, some lignite present		
-17	12				12-13' Lost Sample		
-18	13				End of Boring		
-19	14						
-20	15						
-21	16						
-22	17						
-23	18						
-24	19						
-25	20						
-26	21						
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-11e

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-12

Sheet 1 of 2

Date(s) Drilled	11/6/2017 - 11/6/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	12.5 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	11.7 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	8.8 feet
Location	N 316294.780 E 208751.450	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
	0	6.4			0-1.3' very soft, saturated, dark gray green to black, becomes gray green to brownish gray green at bottom, SILT to silty CLAY, slight sheen seen on water, slight odor of petroleum; (modern DE River sediment)	Slight Petroleum Odor	0.0-0.5' Sample
-5		9.1					0.5-1.0' Sample
	1						
-6			1.0		1.3-2.7' loose, wet, brown grading down to reddish brown, angular to sub-angular fine grading down to coarse SAND (50%) and rounded fine GRAVEL (50%)		
	2		1.0				
-7			1.2				
	3		2.4		2.7-2.9' loose, wet, medium brown above and reddish orange brown, m-c SAND, some silt, erosional contact above		
		0.7			2.9-3.8' loose, wet, reddish brown to brown, coarse sub-rounded to rounded coarse GRAVEL (75%), little coarse sand (25%)		3.2-3.7' Sample (+Dup)
-8			8.9				
	4		3.5		3.8-4.6' loose, wet, reddish brown to brown, m-c SAND (80%), little gravel (20%), black oxide nodules present		
-9			4.4		4.6-7.6' loose, wet to saturated, medium brown to orange brown, poorly sorted SAND (75%), little sub-angular to sub-rounded coarse gravel (25%)	Slight sweet odor	
	5		3.6				
-10			3.5				
	6		7.5				
		0.05					6.3-6.8' Sample
-11			6.8				
	7						
-12					7.6-7.8' loose, wet, orange brown, f-m SAND, little fine gravel		
	8				7.8-9.2' loose, wet, brown to medium brown, some orange oxide areas, SAND (75%), little gravel (25%), increased gravel concentration at base	Slight odor	
-13							
	9	0.1					8.6-9.1' Sample
			8-10				
-14		10.4			9.2-9.22 brick red, HARDPAN oxide layer		9.1-9.3' Sample (Aquitard)
	10				9.22-11.8' stiff, saturated, oxide orange brown and gray, varves, grading into gray with dark oxides, plastic, silty CLAY and CLAY, lots of lignite and wood from middle and bottom of unit;		

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-12e

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Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-12

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10		5.5				
-16	11						
-17	12				11.8-12.5' Lost Recovery		
-18	13				End of Boring		
-19	14						
-20	15						
-21	16						
-22	17						
-23	18						
-24	19						
-25	20						
-26	21						
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-12e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-13

Sheet 1 of 2

Date(s) Drilled	11/06/2017 - 11/06/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	12.5 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	11.5 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	7.7 feet
Location	N 316240.420 E 208709.120	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
	0		0-0.1		0-1.1' very soft, saturated, gray green to gray black, SILT; (modern DE River sediment)		0.0-0.5' Sample
-5		3.4					
		4.1					0.5-1.0' Sample
	1				1.1-1.6' very loose to loose, wet to saturated, dark brown to black, GRAVEL		
-6					1.6-2.4' loose, wet to saturated, brown to greenish brown, poorly sorted SAND, some sub-rounded to rounded f-m gravel		
	2						
-7					2.4-3.3' loose, wet, reddish brown, well sorted SAND (75%), little sub-rounded to rounded coarse gravel (25%)		
	3						
-8			0-0.2		3.3-4.1' loose, wet, reddish brown, well sorted SAND (50%) and sub-angular coarse GRAVEL (50%)		
	4						
		0.4			4.1-5.0' loose, wet, reddish brown to oxide orange brown and black, sub-rounded grading down to rounded GRAVEL (75%), increasing gravel size with depth, little coarse sand (25%), oxide layers		4.3-4.8' Sample
-9	5						
					5.0-6.8' loose, wet, oxide orange brown to strong brown, well sorted SAND (75%), little gravel (25%)		
-10							
	6						
		0.04					6.3-6.8' Sample
-11					6.8-6.85' sub-angular COBBLE, trace green silt, mica present		
	7				6.85-7.0' loose wet, orange brown, sub-angular to sub-rounded GRAVEL and SAND		
-12					7.0-7.3' loose, wet, strong orange brown, SAND (75%), little gravel (25%), trace silt (<5%)		
		0.05			7.3-9.2' loose, strong orange brown, SAND (50%) and rounded COBBLES (50%), increasing cobble concentration towards base		7.8-8.9' Sample (MS/MSD)
-13	8						
		4.8					
	9						8.9-9.1' Sample
-14			0.9		9.2-11.2' stiff, wet to saturated, oxide orange brown to strong orange to yellow brown, grading into dark brown to gray, plastic, CLAY to silty CLAY, white dropstones, mica present		
	10						

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Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-13

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10		0				
-16	11				11.2-12.5' Lost Recovery		
-17	12				End of Boring		
-18	13						
-19	14						
-20	15						
-21	16						
-22	17						
-23	18						
-24	19						
-25	20						
-26	21						
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-13e

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Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-14

Sheet 1 of 2

Date(s) Drilled	11/1/2017 - 11/1/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	12.0 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	11.8 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	5.7 feet
Location	N 316238.710 E 208785.310	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
0	0	34.5			0-0.5' very soft, saturated, green gray to green to black, organic rich SILT, some fine sand, trace mica, some shells, some rootlets; (modern DE River sediment)		0.0-0.5' Sample
-5	1	38.8	0.3		0.5-1.0' soft, saturated, gray green to black, sandy SILT; (modern DE River sediment)		0.5-1.0' Sample (MS/MSD)
			50		1.0-1.6' med gray to light gray, m-c SAND, some fine sand, some fine gravel, sharp contact above		
-6	2				1.6-2.2' loose, wet, strong iron oxide orange brown, f-m SAND, little fine gravel, increasing gravel concentration with depth (up to 25%)		
					2.2-3.1' loose, wet, rounded coarse GRAVEL (75%), little sub-rounded m-c sand (25%)		
-7	3				3.1-3.7' loose wet, strong orange brown to brown, poorly sorted SAND (50%) and GRAVEL (50%), sharp contact above		
-8	4		<10		3.7-5.5' loose, wet, brownish green, f-m SAND, some coarse sand, trace mica,		
-9	5	0.8	5.5				4.5-5.0' Sample
-10	6	0.3			5.5-5.8' loose, strong orange brown, rounded coarse GRAVEL/COBBLE (80%), little fine sand (20%)		5.5-6.0' Sample
					5.8-7.8' loose, saturated, reddish brown to brown, sub-angular grading down to rounded coarse GRAVEL, some sand, cobbles at base		
-11	7		6.5				
-12	8		8				
-13	9	0.08					8.5-9.0' Sample
			0		8.8-9.1' wet, strong oxide orange yellow color, loose SAND and GRAVEL, grading into stiff plastic silty CLAY,		
-14	10	33.1			9.1-10.8' stiff, wet, oxide brown to orange tan with strong oxide red layers, varves, plastic, silty CLAY		9.0-9.5' Sample (Aquitard)

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-14e

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Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-14

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10						
	11				10.8-11.8' stiff, orange transitions sharply to gray, clayey SILT to silty CLAY, top of unit has varves with very fine sand, lignite and rootlets present, wood throughout, becomes very sandy towards base, microfossils present, trace mica		
-16					11.8-12.0' Lost Recovery		
	12				End of Boring		
-17	13						
-18	14						
-19	15						
-20	16						
-21	17						
-22	18						
-23	19						
-24	20						
-25	21						
-26	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-14e

Project: DE River NAPL Delineation Phase III
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring E16-BOR-07

Sheet 1 of 1

Date(s) Drilled	11/03/2017 - 11/03/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	3.4 feet
Type of Boat / Barge	OSI Barge	Contractor	Ocean Surveys Inc.	Field Core Recovery	3.1 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	5.3 feet
Location	N 316389.510 E 209032.510	Sampling Method(s)	Liner- Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
0	0	44.6			0-0.5' very soft, saturated, dark gray green, SILT; (modern DE River sediment)	Petroleum odor. Slight sheen on water.	0.0-0.5' Sample
-4	4	30.1	0		0.5-1.0' loose, wet to saturated, dark gray brown, gray green brown, black, m-c SAND, some silt; (modern DE River sediment)		0.5-1.0' Sample
-1	1		0		1.0-1.5' loose, wet to saturated, green brown, SAND, some silt		
-5	5				1.5-1.6' strong orange brown, SAA		
-2	2		0		1.6-1.8' loose, wet, sub-rounded to rounded silty SAND, grading to coarse sand, oxide orange layer at base		
-6	6				1.8-3.1' loose, wet, orange brown, angular to sub-angular m-c SAND		
-3	3		0		3.1-3.4' Lost Recovery		
-7	7				End of Boring		
-4	4						
-8	8						
-5	5						
-9	9						
-6	6						
-10	10						
-7	7						
-11	11						
-8	8						
-12	12						
-9	9						
-13	13						
-10	10						

Report: DUPON..._ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 E16-BOR-07e

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Project: DE River NAPL Delineation Phase III
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring E16-BOR-08

Sheet 1 of 1

Date(s) Drilled	10/31/2017 - 10/31/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	3.1 feet
Type of Boat / Barge	Candu Boat	Contractor	Ocean Surveys, Inc (OSI)	Field Core Recovery	2.7 feet
Surface Water Body	E16-DE River	Operators	Morgan Barrett	Surface Water Depth	3.1 feet
Location	N 316421.340 E 209035.650	Sampling Method(s)	Vibracore-Liner Continous Core	Sampling Crew	KWest/A.Dyroff/J.Gomes

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
0	0	1.0	0		0-0.1' very soft, saturated, green brown, SILT; (modern DE River sediment)		Sampled 0-0.5"
-4	1	2.3	0		0.1-0.5' very soft to soft, medium gray brown to gray with some nodules of oxide orange color, wet to saturated, organic rich SILT, some clay, some clams, root material; (modern DE River sediment)		Sampled 0.5-1.0'
-5	2		0		0.5-2.5' soft, saturated, medium gray brown to gray, SILT, some clay, some layers of fine sand, sand concentration increasing with depth, some roots and other woody organic matter		
-6	3		0		2.5-3.1 Lost Recovery		
-7	4				End of Boring		
-8	5						
-9	6						
-10	7						
-11	8						
-12	9						
-13	10						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 E16-BOR-08e

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-21

Sheet 1 of 2

Date(s) Drilled	11/4/2017 - 11/4/2017	Logged By		Checked By	C.Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	13.0 feet
Type of Boat / Barge	OSI Barge	Contractor	Ocean Surveys Inc.	Field Core Recovery	10.6 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	5.3 feet
Location	N 316176.710 E 208667.290	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	Sum Organics, - mg/kg	PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
0	0	1.7			0-0.5' very soft, saturated, black to gray green, organic rich SILT, sticks/wood, a layer of oyster shells; (modern DE River sediment)		0.0-0.5' Sample
-5		2.3			0.5-1.0' very soft (sticky), saturated, dark gray green to black, silty CLAY, shells throughout interval	Strong petroleum odor.	0.5-1.0' Sample
	1				1.0-2.3' medium dense, variegated brown to reddish, greenish brown, m-c SAND (85-90%), few gravel (10%), trace silt		
-6			0.1		2.0-2.4' loose, wet, orange brown, SAND, trace micaceous silt, oxide bands present; (could be weathered Wissahickon Schist)		
	2		0.1		2.4-2.6' loose, wet, brown to orange brown, sub-rounded to rounded coarse GRAVEL/COBBLES (75%), little sand (25%), sharp contact above		
-7					2.6-2.8' dark brown to gray brown, SAA		
	3		2.1		2.8-3.6' loose, wet, brownish green to greenish brown, tan , SAND (80%), little gravel (20%)		
-8			2.4		3.6-3.8' loose but lightly cemented, wet, strong orange brown to brick red, hardpan layers of f-m SAND, layers of coarse sand, oxide coating on quartz		
	4		4.8		3.8-4.7' loose, wet, greenish brown to gray brown with orange, SAND (75-80%), little rounded medium gravel (15-20%), trace micaceous silt, oxide layering, slight odor	Slight odor	
-9		0.08	1.2		4.7-5.3' loose, wet, brown to strong brown, SAND, some coarse gravel		4.5-5.0' Sample
	5		3.2		5.3-6.6' loose, wet, brown to medium brown, f-m SAND (90%), few gravel (5-10%), trace micaceous silt, 0.5" thick layer of fine gravel near base of unit		
-10			3.2				6.0-6.5' Sample (MS/MSD)
	6	2.2	10.8		6.6-6.8' loose, wet, medium brown, f-m SAND,		
-11			31.4		6.8-8.0' loose, wet, brown to reddish brown, fine grading down to coarse GRAVEL (75%), little coarse sand (25%), erosional contact above	Chemical odor at base	
	7		20.9				
-12			3.2				7.8-8.0' Sample
	8	0.4	0.7		8.0-8.2' wet, strong orange brown to tan, plastic, CLAY (70%), little silt (30%) hardpan, some oxide present, erosional contact above		8.0-8.3' Sample (Aquitard)
-13		11.2	1.4		8.21-10.3' stiff, wet, gray to dark gray to black gray, plastic, silty CLAY, very thin layers of vf-f sand, trace white rounded dropstones, some varves, very sharp contact above.		
	9		0.4				
-14			0.7				
	10						

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-21

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10		1.2		10.3-10.6' very stiff, wet to saturated, light gray to gray, silty CLAY grading down to silty fine SAND, trace mica 10.6-13.0' Lost Recovery		
-16	11						
-17	12						
-18	13				End of Boring		
-19	14						
-20	15						
-21	16						
-22	17						
-23	18						
-24	19						
-25	20						
-26	21						
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-21e

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-22

Sheet 1 of 2

Date(s) Drilled	11/3/2017 - 11/03/2017	Logged By		Checked By	C.Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	13.4 feet
Type of Boat / Barge	OSI Barge	Contractor	Ocean Surveys Inc.	Field Core Recovery	12.6 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	8.0 feet
Location	N 316149.010 E 208717.680	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	Sum Organics, - mg/kg	PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
	0		0		0-0.5' very soft, saturated, gray green, SILT, some sticks; (modern DE River sediment)	Strong petroleum odor	0.0-0.5' Sample
-5		6.8	1.8		0.5-1.0' loose becoming more dense with depth, wet, dark gray, poorly sorted SAND (85-90%), few silt (10%), trace coarse gravel	Strong petroleum odor.	0.5-1.0' Sample
	1	0.4	9.3		1.0-3.6' brown to reddish brown, SAND (85-90%), few silt (10%), trace sub-rounded to rounded gravel, mica present	Odor	
-6							
	2		2.6				2.0-2.5' Sample
-7		1.1					
	3		0				
-8					3.6-5.5' loose, wet, reddish brown to brown, SAND, trace silt, <1" thick layers of coarse sand, red oxide layering		
	4		10.2				
-9			8.8				
	5		15.9				
-10			1.2		5.5-7.3' loose, wet, medium brown to brown, m-c SAND and sub-rounded to rounded fine GRAVEL	Strong chemical odor.	
	6		49.7				
-11			94.4				
	7		151				7.0-7.5' Sample
		0.2			7.3-7.6' wet to saturated, burgandy color, weathered siltstone COBBLES	Strong chemical odor.	
-12			50.5		7.6-8.0' loose, wet to saturated, brown to orange brown, m-c SAND, trace silt		
	8	7.8					7.8-8.0' Sample
		12.3	91		8.0-8.2' hard, wet to saturated, strong oxide red brown, hardpan SAND		8.0-8.2' Sample (+DUP)
-13					8.2-8.6' wet to saturated, strong orange to tan brown, plastic, clayey SILT, oxide layering, some black oxide nodules		8.0-8.5' Metals
	9				8.6-9.6' moist to wet, gradual color change from oxide orange to tan brown, plastic, silty CLAY, few very fine sand, sandy orange oxide layers		
-14			36		9.6-10.0' stiff, wet, dark gray to gray brown, plastic, CLAY and SILT, trace fine gravel,		
	10						

Report: DUPO..._ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-22e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-22

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10		25.9		trace mica, microfossils present, trace white rounded dropstones, gradual contact above.		
					10.0-12.6' loose, wet to saturated, light tan to white tan, f-m SAND, trace rounded fine gravel, some orange oxide nodules, sharp contact above		
-16	11		16.3				
			4.6				
-17	12		10.3				
			0		12.6-13.4' Lost Recovery		
-18	13		17.3		End of Boring		
-19	14						
-20	15						
-21	16						
-22	17						
-23	18						
-24	19						
-25	20						
-26	21						
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-22e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-23

Sheet 1 of 2

Date(s) Drilled	11/3/2017 - 11/3/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	13.0 feet
Type of Boat / Barge	OSI Barge	Contractor	Ocean Surveys Inc.	Field Core Recovery	11.8 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	7.3 feet
Location	N 316202.470 E 208737.410	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	Sum Organics, - mg/kg	PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
	0	126.6			0-0.5' very soft, saturated, gray green, SILT; (modern DE River sediment)	Strong petroleum odor	0-0.5 Sample (+Dup)
-5		42.2			0.5-1.0' soft becoming more stiff with depth, wet to saturated, medium to dark gray green, SILT, some f-m sand, increasing sand concentration with depth, trace mica	Strong petroleum odor. Sheen on water.	0.5-1.0' Sample
	1		10.5				
-6			45		1.0-2.3' wet, loose, dark gray to brown gray, becomes reddish brown with depth, m-c SAND (75%), little angular to sub-angular fine gravel (25%)		
	2		35				
			36				
-7					2.3-2.5' loose, wet, tan brown to gray brown, varves, very fine SAND, trace silt, sandy orange brown oxide layer at base		
			40		2.5-3.75' loose, wet to saturated, reddish brown, poorly sorted m-c SAND (75%), little sub-angular to sub-rounded f-m gravel (25%)		
	3		58				3.0-3.5 Sample
-8		0.32					
			33				
	4				3.75-4.1' loose, wet to saturated, strong orange brown to yellow brown, coarse SAND (90-95%), few angular gravel (5-10%)		
-9			168		4.2-4.8' loose, medium to strong orange brown, SAND and coarse GRAVEL		
	5		63.8		4.8-5.0' loose, wet to saturated, tan with some oxide orange at base, very fine SAND, some silt		5.0-6.0 Sample
-10		0.03			5.0-5.8' loose, wet to saturated, strong orange brown to brown, well sorted SAND, sharp contact above		
	6		170.3		5.8-6.0' loose, wet to saturated, tan to brown tan, f-m SAND, little coarse sand, trace rounded gravel		
-11			152				
	7				6.8-7.5' loose, wet to saturated, brown grading into brown orange at base, m-c SAND, some sub-rounded to rounded gravel		
-12			116.4				
			38.2		7.75-8.75' loose, wet to saturated, dark brown to gray brown, SAND (75%), little sub-rounded to rounded gravel (25%)	Strong Chemical odor	
	8		152				8-8.5' Sample
-13		0.23	116.4				
			38				
	9		201		8.75-9.2' dark brown to gray brown, SAA, orange oxide present on gravel	Chemical Odor	
			86.3				
-14					9.2-9.21' sharp erosional contact		9.5-9.7 Sample (Top Aquitard)
		13.22	18.8		9.21-10.8' wet to saturated, strong tan orange oxide, color change from oxide orange to gray at 9.75', very fine sandy SILT, increasing sand concentration with depth, some varves top, oxide sand at base		
	10						

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-23

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10		5.1				
			15.5				
-16	11				10.8-11.8' medium stiff increasing to very stiff with depth, wet to saturated, dark gray, plastic, silty CLAY		
			0.0		11.8-13.0' Lost Recovery		
-17	12						
-18	13				End of Boring		
	14						
-19	15						
-20	16						
-21	17						
-22	18						
-23	19						
-24	20						
-25	21						
-26	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-23e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-24

Sheet 1 of 2

Date(s) Drilled	11/1/2017 - 11/1/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	12.4 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	9.8 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	3.4 feet
Location	N 315925.390 E 208484.490	Sampling Method(s)	liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	Sum Organics, - mg/kg	PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-4	0	1.2			0-0.2' very soft, saturated, medium gray to black, SILT; (modern DE River sediment)		Sampled 0.0-0.5
		58.6			0.2-1.0' loose, wet, gray and brown gray, sub-rounded f-m SAND		Sampled 0.5-1.0
-5	1		3.0		1.0-1.2' dark gray to black, fine SAND, a layer of silty clay	Slight Petroleum Odor	
					1.2-2.2' loose, saturated, brown, fine SAND		
-6	2		4.5		2.2-3.1' loose, wet to saturated, brown, angular fine grading down to coarse SAND (75%), little rounded coarse gravel (25%) at depth	Strong Petroleum Odor	
		0.2					
-7	3		11.5		3.1-4.9' loose, wet, brown to brown orange, sub-angular to sub-rounded m-c SAND		Sampled 2.7-3.0'
-8	4						
-9	5		30-45		4.9-5.1' soft, wet to saturated, dark gray to black, clayey SILT, trace red/orange oxide red/orange		Sampled 5.0-5.5'
		0.6			5.1-5.3' loose, wet, oxide brown, f-m SAND, sharp contact above		
					5.3-5.7' loose, wet, gray, sub-rounded SAND (70-80%), little rounded coarse gravel (10-20%)		
-10	6				5.7-6.2' loose, wet, dark gray, SAND (75%), little sub-rounded to rounded coarse gravel (25%), trace silt (<5%), cobble at bottom	Chemical Odor	Sampled 6.0-6.5'
		0.2			6.2-7.0' wet, gray to brown to oxide orange, plastic, silty CLAY, very fine sand layers, contact above	Chemical Odor	
-11	7	22.0	5+/20/5		7.0-7.2' wet to saturated, loose, dark brown black, angular m-c SAND (85%), few rounded gravel (10-15%), one cobble	Strong Chemical Odor.	Sampled 6.5-7.1 (clay)
		2.1	<20				7.0-7.2' Sample
		27.5 (D)			7.2-9.8' medium orange tan, brown, medium gray, tan, tan white, varves, CLAY (70%), little silt (30%), increasing clay concentration with depth, thin layer of oxide orange sand at base, sharp contact above		7.2-7.7' Sample (+Dup)
-12	8						
-13	9						
-14	10				9.8-12.4' Lost Recovery		

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-24e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-24

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-14	10						
-15	11						
-16	12						
-17	13				End of Boring		
-18	14						
-19	15						
-20	16						
-21	17						
-22	18						
-23	19						
-24	20						
-25	21						
-26	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-24e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-25

Sheet 1 of 2

Date(s) Drilled	11/04/2017 - 11/04/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	13.0 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	11.9 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	7.8 feet
Location	N 315983.180 E 206668.170	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
0	0		NA		Core Not Opened 0-7.8 feet. Sample for Treatability only from bottom of B Aquifer. Core A=7.9-9.1' sampled, Core B=5.4-6.9' sampled, Core C=7.0-8.6' Sampled		
-4	1						
-5	2						
-6	3						
-7	4						
-8	5						
-9	6						
-10	7						
-11	8		100+		Core B 7.9-9.1' dark brown/black, poorly sorted, well rounded SAND and GRAVEL, some gravel 3-4" diameter which did not go into sample jars. Core C 7-8.6' SAND and GRAVEL, PID 300+ at contact, 291 in S&G above in B Aquifer.	Strong Chemical Odor	
-12	9				9.1-11.9' wet, oxide orange brown to tan, gray at base, silty CLAY (B/C)		
-13	10						

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D15-BOR-25

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-14	10						
	11						
-15							
	12						
-16							
	13				13' End of boring		
-17							
	14						
-18							
	15						
-19							
	16						
-20							
	17						
-21							
	18						
-22							
	19						
-23							
	20						
-24							
	21						
-25							
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D15-BOR-25e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-09

Sheet 1 of 2

Date(s) Drilled	11/06/2017 - 11/06/2017	Logged By		Checked By	C.Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	13.5 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	11.4 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	5.4 feet
Location	N 316205.530 E 208608.770	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-5	0	6.1	0.1		0-1.6' very soft (sticky), saturated, dark brown black to green black, SILT (70%), little clay (25%), layer of sand and gravel (5%) at 1.5'; (modern DE River sediment)		0.0-0.5' Sample
		9.3					0.5-1.0' Sample (+PCB MS/MSD)
-6	1		0.1				
-7	2		0.1		1.6-1.9' loose, dark brown to gray, sub-rounded to rounded GRAVEL (90%), few sand (10%)		
					1.9-3.4' loose, wet, reddish brown to yellow brown, f-m SAND, trace gravel		
-8	3		0.1				
-9	4		0.1		3.4-4.6' loose, wet to saturated, yellowish brown to tan brown, f-m SAND (90%), few sub-rounded to rounded coarse gravel, trace coarse sand		
-10	5		0.1		4.6-4.9' loose, wet, brown to reddish brown, medium grained GRAVEL (80%), little m-c sand (20%),		
					4.9-6.0' wet, loose, brown to orange brown, SAND (60%), some sub-rounded to rounded gravel (40%) increasing concentration with depth		5.4-5.9' Sample
-11	6	0.05	0.1		6.0-6.6' loose, wet, gray to gray white with oxide orange, very fine SAND and SILT, very fine varves		
-12	7	0.5	0.1		6.6-6.8' wet to saturated, oxide orange and tan brown to gray, plastic, silty CLAY, very fine varves		6.6-6.8' Sample (Aquitard)
		0.12			6.8-7.4' loose, wet to saturated, gray to gray white with some oxide layers, fine SAND, some silt, trace mica		6.8-7.4' Sample (Sand)
-13	8		0.1		7.4-10.6' loose, wet, gray to white, very well sorted SAND, some micaceous silt, some oxide layers with coarse sand, small shells; (D Aquifer)		
-14	9		0.1				
	10						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-09e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-09

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10		0.1				
		0.02			10.6-11.4' loose, wet, gray white to tan brown, SAND (80-85%), little rounded coarse gravel (15-20%), sharp contact above		
-16	11				11.4-13.5' Lost Recovery		
	12						
-17							
	13						
-18					End of Boring		
	14						
-19							
	15						
-20							
	16						
-21							
	17						
-22							
	18						
-23							
	19						
-24							
	20						
-25							
	21						
-26							
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-09e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-10

Sheet 1 of 2

Date(s) Drilled	11/7/2017 - 11/7/2017	Logged By		Checked By	C.Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	12.8 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	12.2 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	5.3 feet
Location	N 316283.320 E 208648.520	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
	0		0		0-0.5' very soft, saturated, gray green to black, organic rich SILT, some shells; (modern DE River sediment)	Petroleum Odor	0.0-1.0' Sample
-5		3.6					
		39.1			0.5-1.0' loose, saturated, gray green to brownish green, SILT and fine SAND		0.5-1.0' Sample (MS/MSD)
	1						
-6					1.0-1.5' loose saturated, silty SAND grading down to sandy SILT, some mica present		
					1.5-3.1' loose, wet to saturated, gray to gray brown, sub-rounded to sub-angular poorly sorted GRAVEL (90-95%), few sand (5-10%)		
-7	2						
	3						
-8					3.1-4.1' loose, wet, oxide brown to orange brown, fine grading down to medium SAND, trace gravel		
	4						
-9					4.1-6.0' loose, wet to saturated, gray green brown to brown, poorly sorted SAND and sub-rounded GRAVEL		
	5		0				
-10		0.05					5.0-5.5' Sample
	6				6.0-6.4' loose, wet, dark brown to black, SAND and rounded GRAVEL, oxide present		60-6.5' Sample
-11		0.1					
					6.4-8.0' loose, wet, variegated reddish brown to orange brown, GRAVEL (75%), little sand (25%), sharp contact above		
	7						
-12		0.6					7.0-7.3' Sample
	8						
-13					8.0-8.5' loose, wet, brown, sub-angular to sub-rounded well sorted GRAVEL (95%), trace sand (5%)		
					8.5-8.8' stiff to hard, saturated, , highly oxidized orange to gray with fine layers, silty CLAY to clayey SILT, trace gravel at top of unit, erosional contact above		
	9		0		8.8-10.3' saturated, plastic, silty CLAY, some fine sand, trace gravel, trace white dropstones		
-14							
	10						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-10e

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Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-10

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10		0		10.3-10.35' gray to strong oxide orange, very fine SAND, sharp erosional CONTACT		
-16	11	0.06			10.3-12.2' loose, wet, gray to gray white, silty fine SAND, some fine gravel, white dropstones, some mica present		11.0-11.3 Sample
-17	12				12.2'-12.8' Lost Recovery		
-18	13				End of Boring		
-19	14						
-20	15						
-21	16						
-22	17						
-23	18						
-24	19						
-25	20						
-26	21						
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-10e

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-11

Date(s) Drilled	11/07/2017 - 11/07/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	13.0 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	11.8 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	3.5 feet
Location	N 316343.510 E 208695.970	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-5	0	3.4	0		0-1.0' soft, saturated, black to very dark black, organic rich SILT, oyster shells present; (modern DE River sediment)		0.0-0.5' Sample
		116.9					0.5-1.0' Sample
-6	1		0		1.0-1.6' soft, saturated, dark black to grayish black, silty CLAY to clayey SILT		
-7	2		0		1.6-4.0' loose, wet to saturated, brown, SAND and GRAVEL, sharp contact above		
-8	3		0				
-9	4		0		4.0-4.8' loose, wet, dark brown to reddish brown, sub-rounded to rounded GRAVEL (75%), little sand (25%)		
-10	5		0		4.8-5.2' loose, wet, strong oxide red to orange brown, m-f SAND, trace fine gravel at base		
		0.3			5.2-6.5' loose, wet, brown to reddish brown, poorly sorted SAND (75%), little rounded gravel (25%)		5.5-6.0' Sample
-11	6		0				
-12	7	0.3	0		6.5-6.8' loose, wet, strong orange brown to brown tan, SAND (85-90%), few sub-rounded to rounded gravel (10%), trace silt (<5%)		
					6.8-8.0' loose, wet, medium orange brown, SAND (90%), few fine gravel (10%), gravels increase concentration toward base		7.0-7.5 Sample (+Dup)
-13	8		0		8.0-8.5' loose, wet, oxide brown, well sorted SAND (90%), few fine gravel (10%) in layers		
-14	9		0		8.5-10.3' loose, wet, gray brown to reddish brown, m-c SAND (50%) and sub-angular to sub-rounded GRAVEL (50%)		
	10						

Report: DUPO..._ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-11e

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-11

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10	0.2	0				10-10.3' Sample
		1.0	0.1		10.3-10.31' sharp CONTACT at 10.3'		10.3-10.5' Sample
-16	11		0		10.3-12' gray to oxide orange brown, very fine layers of gray towards bottom, varves, silty CLAY to clayey SILT, some lignite present		
-17	12				12-13' Lost Sample		
-18	13				End of Boring		
-19	14						
-20	15						
-21	16						
-22	17						
-23	18						
-24	19						
-25	20						
-26	21						
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-11e

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-12

Date(s) Drilled	11/6/2017 - 11/6/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	12.5 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	11.7 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	8.8 feet
Location	N 316294.780 E 208751.450	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
	0	6.4			0-1.3' very soft, saturated, dark gray green to black, becomes gray green to brownish gray green at bottom, SILT to silty CLAY, slight sheen seen on water, slight odor of petroleum; (modern DE River sediment)	Slight Petroleum Odor	0.0-0.5' Sample
-5		9.1					0.5-1.0' Sample
	1						
-6			1.0		1.3-2.7' loose, wet, brown grading down to reddish brown, angular to sub-angular fine grading down to coarse SAND (50%) and rounded fine GRAVEL (50%)		
	2		1.0				
-7			1.2				
	3		2.4		2.7-2.9' loose, wet, medium brown above and reddish orange brown, m-c SAND, some silt, erosional contact above		
		0.7			2.9-3.8' loose, wet, reddish brown to brown, coarse sub-rounded to rounded coarse GRAVEL (75%), little coarse sand (25%)		3.2-3.7' Sample (+Dup)
-8			8.9				
	4		3.5		3.8-4.6' loose, wet, reddish brown to brown, m-c SAND (80%), little gravel (20%), black oxide nodules present		
-9			4.4		4.6-7.6' loose, wet to saturated, medium brown to orange brown, poorly sorted SAND (75%), little sub-angular to sub-rounded coarse gravel (25%)	Slight sweet odor	
	5		3.6				
-10			3.5				
	6		7.5				
		0.05					6.3-6.8' Sample
-11			6.8				
	7						
-12					7.6-7.8' loose, wet, orange brown, f-m SAND, little fine gravel		
	8				7.8-9.2' loose, wet, brown to medium brown, some orange oxide areas, SAND (75%), little gravel (25%), increased gravel concentration at base	Slight odor	
-13							
	9	0.1					8.6-9.1' Sample
		10.4	8-10		9.2-9.22 brick red, HARDPAN oxide layer		9.1-9.3' Sample (Aquitard)
-14					9.22-11.8' stiff, saturated, oxide orange brown and gray, varves, grading into gray with dark oxides, plastic, silty CLAY and CLAY, lots of lignite and wood from middle and bottom of unit;		
	10						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-12e

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Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-12

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10		5.5				
-16	11						
-17	12				11.8-12.5' Lost Recovery		
-18	13				End of Boring		
-19	14						
-20	15						
-21	16						
-22	17						
-23	18						
-24	19						
-25	20						
-26	21						
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-12e

AECOM

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-13

Date(s) Drilled	11/06/2017 - 11/06/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	12.5 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	11.5 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	7.7 feet
Location	N 316240.420 E 208709.120	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-5	0	3.4	0-0.1		0-1.1' very soft, saturated, gray green to gray black, SILT; (modern DE River sediment)		0.0-0.5' Sample
		4.1					0.5-1.0' Sample
-6	1				1.1-1.6' very loose to loose, wet to saturated, dark brown to black, GRAVEL		
-7	2				1.6-2.4' loose, wet to saturated, brown to greenish brown, poorly sorted SAND, some sub-rounded to rounded f-m gravel		
-8	3				2.4-3.3' loose, wet, reddish brown, well sorted SAND (75%), little sub-rounded to rounded coarse gravel (25%)		
	4		0-0.2		3.3-4.1' loose, wet, reddish brown, well sorted SAND (50%) and sub-angular coarse GRAVEL (50%)		
-9		0.4			4.1-5.0' loose, wet, reddish brown to oxide orange brown and black, sub-rounded grading down to rounded GRAVEL (75%), increasing gravel size with depth, little coarse sand (25%), oxide layers		4.3-4.8' Sample
-10	5				5.0-6.8' loose, wet, oxide orange brown to strong brown, well sorted SAND (75%), little gravel (25%)		
-11	6	0.04					6.3-6.8' Sample
	7				6.8-6.85' sub-angular COBBLE, trace green silt, mica present		
-12					6.85-7.0' loose wet, orange brown, sub-angular to sub-rounded GRAVEL and SAND		
					7.0-7.3' loose, wet, strong orange brown, SAND (75%), little gravel (25%), trace silt (<5%)		
-13	8	0.05			7.3-9.2' loose, strong orange brown, SAND (50%) and rounded COBBLES (50%), increasing cobble concentration towards base		7.8-8.9' Sample (MS/MSD)
	9	4.8					8.9-9.1' Sample
-14			0.9		9.2-11.2' stiff, wet to saturated, oxide orange brown to strong orange to yellow brown, grading into dark brown to gray, plastic, CLAY to silty CLAY, white dropstones, mica present		
	10						

Report: DUPO..._ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-13e

Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-13

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10		0				
-16	11				11.2-12.5' Lost Recovery		
-17	12				End of Boring		
-18	13						
-19	14						
-20	15						
-21	16						
-22	17						
-23	18						
-24	19						
-25	20						
-26	21						
	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-13e

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Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-14

Sheet 1 of 2

Date(s) Drilled	11/1/2017 - 11/1/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	12.0 feet
Type of Boat / Barge	Candu OSI	Contractor	Ocean Surveys Inc.	Field Core Recovery	11.8 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	5.7 feet
Location	N 316238.710 E 208785.310	Sampling Method(s)	Liner-Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
0	0	34.5			0-0.5' very soft, saturated, green gray to green to black, organic rich SILT, some fine sand, trace mica, some shells, some rootlets; (modern DE River sediment)		0.0-0.5' Sample
-5	1	38.8	0.3		0.5-1.0' soft, saturated, gray green to black, sandy SILT; (modern DE River sediment)		0.5-1.0' Sample (MS/MSD)
			50		1.0-1.6' med gray to light gray, m-c SAND, some fine sand, some fine gravel, sharp contact above		
-6	2				1.6-2.2' loose, wet, strong iron oxide orange brown, f-m SAND, little fine gravel, increasing gravel concentration with depth (up to 25%)		
					2.2-3.1' loose, wet, rounded coarse GRAVEL (75%), little sub-rounded m-c sand (25%)		
-7	3				3.1-3.7' loose wet, strong orange brown to brown, poorly sorted SAND (50%) and GRAVEL (50%), sharp contact above		
-8	4		<10		3.7-5.5' loose, wet, brownish green, f-m SAND, some coarse sand, trace mica,		
-9	5	0.8	5.5				4.5-5.0' Sample
-10	6	0.3			5.5-5.8' loose, strong orange brown, rounded coarse GRAVEL/COBBLE (80%), little fine sand (20%)		5.5-6.0' Sample
					5.8-7.8' loose, saturated, reddish brown to brown, sub-angular grading down to rounded coarse GRAVEL, some sand, cobbles at base		
-11	7		6.5				
-12	8		8				
-13	9	0.08					8.5-9.0' Sample
			0		8.8-9.1' wet, strong oxide orange yellow color, loose SAND and GRAVEL, grading into stiff plastic silty CLAY,		
-14	10	33.1			9.1-10.8' stiff, wet, oxide brown to orange tan with strong oxide red layers, varves, plastic, silty CLAY		9.0-9.5' Sample (Aquitard)

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-14e

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Project: DE River NAPL Delineation Phase 3
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring D16-BOR-14

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
-15	10						
	11				10.8-11.8' stiff, orange transitions sharply to gray, clayey SILT to silty CLAY, top of unit has varves with very fine sand, lignite and rootlets present, wood throughout, becomes very sandy towards base, microfossils present, trace mica		
-16	12				11.8-12.0' Lost Recovery End of Boring		
-17	13						
-18	14						
-19	15						
-20	16						
-21	17						
-22	18						
-23	19						
-24	20						
-25	21						
-26	22						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 D16-BOR-14e

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Project: DE River NAPL Delineation Phase III
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring E16-BOR-07

Sheet 1 of 1

Date(s) Drilled	11/03/2017 - 11/03/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	3.4 feet
Type of Boat / Barge	OSI Barge	Contractor	Ocean Surveys Inc.	Field Core Recovery	3.1 feet
Surface Water Body	DE River	Operators	Morgan Barrett	Surface Water Depth	5.3 feet
Location	N 316389.510 E 209032.510	Sampling Method(s)	Liner- Continous Core	Sampling Crew	KW/JG/AD

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
0	0	44.6			0-0.5' very soft, saturated, dark gray green, SILT; (modern DE River sediment)	Petroleum odor. Slight sheen on water.	0.0-0.5' Sample
-4	4	30.1	0		0.5-1.0' loose, wet to saturated, dark gray brown, gray green brown, black, m-c SAND, some silt; (modern DE River sediment)		0.5-1.0' Sample
-1	1		0		1.0-1.5' loose, wet to saturated, green brown, SAND, some silt		
-5	5				1.5-1.6' strong orange brown, SAA		
-2	2		0		1.6-1.8' loose, wet, sub-rounded to rounded silty SAND, grading to coarse sand, oxide orange layer at base		
-6	6				1.8-3.1' loose, wet, orange brown, angular to sub-angular m-c SAND		
-3	3		0		3.1-3.4' Lost Recovery		
-7	7				End of Boring		
-4	4						
-8	8						
-5	5						
-9	9						
-6	6						
-10	10						
-7	7						
-11	11						
-8	8						
-12	12						
-9	9						
-13	13						
-10	10						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 E16-BOR-07e

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Project: DE River NAPL Delineation Phase III
Project Location: Deepwater, NJ
Project Number: 60485202.17001

Log of Boring E16-BOR-08

Sheet 1 of 1

Date(s) Drilled	10/31/2017 - 10/31/2017	Logged By		Checked By	C. Myers
Coring Method	Push Corer	Boring Diameter	4"	Total Core Penetration	3.1 feet
Type of Boat / Barge	Candu Boat	Contractor	Ocean Surveys, Inc (OSI)	Field Core Recovery	2.7 feet
Surface Water Body	E16-DE River	Operators	Morgan Barrett	Surface Water Depth	3.1 feet
Location	N 316421.340 E 209035.650	Sampling Method(s)	Vibracore-Liner Continous Core	Sampling Crew	KWest/A.Dyroff/J.Gomes

Elevation feet	Depth, feet	SAMPLES: Sum Organics, - mg/kg	SAMPLES: PID, ppm	Graphic Log	MATERIAL DESCRIPTION	Odor Observations	Sample Intervals
	0	1.0	0		0-0.1' very soft, saturated, green brown, SILT; (modern DE River sediment)		Sampled 0-0.5"
-4		2.3			0.1-0.5' very soft to soft, medium gray brown to gray with some nodules of oxide orange color, wet to saturated, organic rich SILT, some clay, some clams, root material; (modern DE River sediment)		Sampled 0.5-1.0'
	1		0		0.5-2.5' soft, saturated, medium gray brown to gray, SILT, some clay, some layers of fine sand, sand concentration increasing with depth, some roots and other woody organic matter		
-5							
	2		0				
-6							
	3		0		2.5-3.1 Lost Recovery		
-7					End of Boring		
	4						
-8							
	5						
-9							
	6						
-10							
	7						
-11							
	8						
-12							
	9						
-13							
	10						

Report: DUPONT_ENV4 SEDIMENT 10-12; File: DUPONT CWKS_1_24_2018.GPJ; 3/9/2018 E16-BOR-08e

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Appendix E

Lines of Evidence (LOE) Summary Tables

Appendix E
Summary of Lines of Evidence
2017 Delaware River NAPL Delineation – Data Gap Phase III Report
Chemours Chambers Works
Deepwater, New Jersey

Boring	Depth (ft below water/sediment interface)	Odor (Y/N)	PID	PID (ppm)	Visual	SOC (mg/kg) No TICs Counted)	NAPL ANAL.
D15-BOR-21	0-0.5	N	NA	NA	N	1.706	NR
	0.5-1.0	Y	NA	NA	N	2.309	NR
	4.5-5.0	Y	L	2.4-4.8	N	0.0808	NR
	6.0-6.5	N	L	3.2	N	2.24	NR
	7.8-8.0	Y	M	31.4-20.9	N	0.437	NR
	8.0-8.3	N	L	0.7-1.4	N	11.182	NR
D15-BOR-22	0-0.5	Y	L	0	N	6.828	NR
	0.5-1.0	Y	L	1.8	N	0.357	NR
	2.0-2.5	Y	L	0-9.3	N	1.065	NR
	7.0-7.5	Y	M - H	49.7-151	N	0.157	NR
	7.8-8.0	Y	M	50.5	N	7.776	NR
	8.0-8.2	N	M	91	N	12.297	NR
	8.0-8.2-dup	N	M	91	N	0.402	NR
	8.0-8.5	N	L	36	N	0	NR
D15-BOR-23	0-0.5	Y	NA	NA	N	126.604	NR
	0.5-1.0	Y	L	10.5	Y	42.214	NR
	3.0-3.5	N	L	40-33	N	0.315	NR
	5.0-6.0	N	M-H	63.8-170	N	0.0349	NR
	8.0-8.5	Y	M-H	38.5-152	N	0.228	NR
	9.5-9.7	Y	M-H	86.3-201	N	13.218	NR
D15-BOR-24	0-0.5	N	NA	NA	N	1.2108	NR
	0.5-1.0	Y	L	3	N	58.602	NR
	2.7-3.0	Y	L	4.5-11.5	N	0.181	NR
	5.0-5.5	Y	M	30-45	N	0.584	NR
	6.0-6.5	Y	M	30-45	N	0.159	NR
	6.5-7.1	Y	M	30-45	N	21.955	NR
	7.0-7.2	Y	M	30-45	N	2.099	NR
	7.2-7.7	Y	L	20	N	7.06	NR
	7.2-7.7 dup	Y	L	20	N	27.502	NR
D16-BOR-09	0-0.5	N	L	0.1	N	6.138	NR
	0.5-1.0	N	L	0.1	N	9.281	NR
	5.4-5.9	N	L	0.1	N	0.051	NR
	6.6-6.8	N	L	0.1	N	0.5097	NR
	6.8-7.4	N	L	0.1	N	0.118	NR
	10.6-11.4	N	L	0.1	N	0.021	NR
D16-BOR-10	0-0.5	Y	L	0	N	3.575	NR
	0.5-1.0	Y	L	0	N	39.139	NR
	5.0-5.5	N	L	0	N	0.046	NR
	6.0-6.5	N	L	0	N	0.097	NR
	7.0-7.3	N	L	0	N	0.654	NR
	11-11.3	N	L	0	N	0.058	NR
D16-BOR-11	0-0.5	N	L	0	N	3.377	NR
	0.5-1.0	N	L	0	N	116.85	NR
	5.5-6.0	N	L	0	N	0.337	NR
	7.0-7.5	N	L	0	N	0.327	NR
	7.0-7.5 dup	N	L	0	N	0.26	NR
	10.0-10.3	N	L	0	N	0.242	NR
	10.3-10.5	N	L	0.1	N	0.9987	NR
D16-BOR-12	0-0.5	Y	NA	NA	N	6.434	NR
	0.5-1.0	Y	L	0-1	N	9.095	NR
	3.2-3.7	N	L	2.4-8.9	N	0.706	NR
	3.2-3.7-dup	N	L	2.4-8.9	N	0.222	NR
	6.3-6.8	Y	L	3.5-7.5	N	0.0547	NR
	8.6-9.1	Y	L	6.8-10	N	0.103	NR
	9.1-9.3	Y	L	8-10	N	10.413	NR

Appendix E
Summary of Lines of Evidence
2017 Delaware River NAPL Delineation – Data Gap Phase III Report
Chemours Chambers Works
Deepwater, New Jersey

Boring	Depth (ft below water/sediment interface)	Odor (Y/N)	PID	PID (ppm)	Visual	SOC (mg/kg) No TICs Counted)	NAPL ANAL.
D16-BOR-13	0-0.5	N	L	0-0.1	N	3.378	NR
	0.5-1.0	N	L	0-0.1	N	4.123	NR
	4.3-4.8	N	L	0-0.2	N	0.412	NR
	6.3-6.8	N	L	0-0.2	N	0.035	NR
	7.8-8.9	N	L	0-0.2	N	0.0508	NR
	8.9-9.1	N	L	0.9	N	4.852	NR
D16-BOR-14	0-0.5	N	L	0-0.3	N	34.492	NR
	0.5-1.0	N	L-M	50	N	38.776	NR
	4.5-5.0	N	L	5.5-<10	N	0.831	NR
	5.5-6.0	N	L	5.5	N	0.337	NR
	8.5-9.0	N	L	6.5	N	0.084	NR
	9.0-9.5	N	L	8	N	33.082	NR
E16-BOR-07	0-0.5	Y	L	0	Y	40.555	NR
	0.5-1.0	Y	L	0	N	30.089	NR
E16-BOR-08	0-0.5	N	L	0	N	1.024	NR
	0.5-1.0	N	L	0	N	2.31	NR

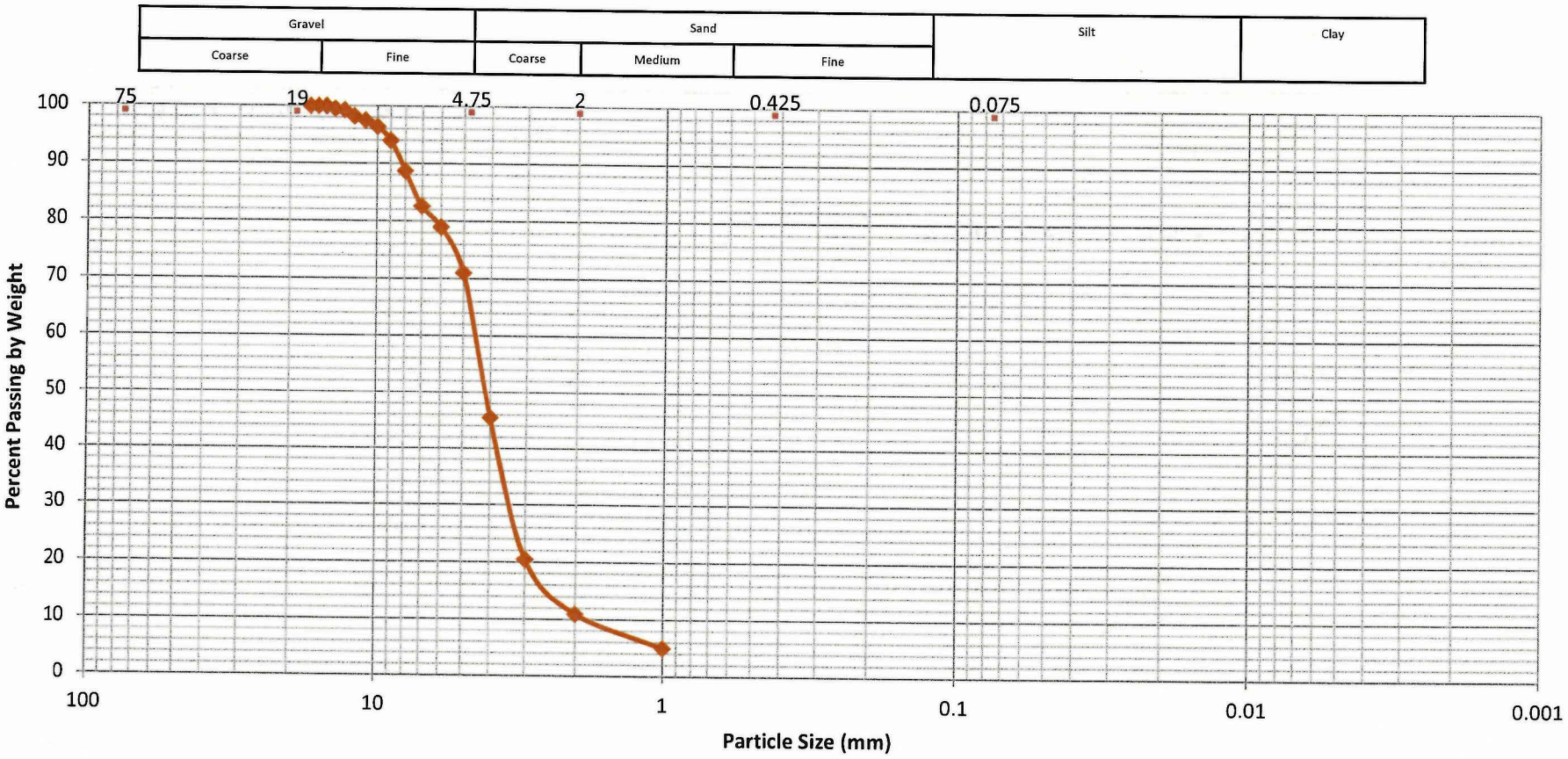
L	0-25
M	25-100
H	100+
NR	Not Run
NA	Not analyzed

Appendix F

Grain Size Distribution Curves

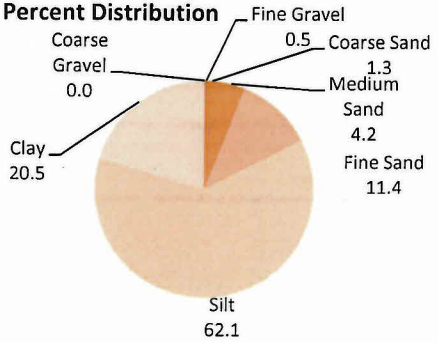
Particle Size Distribution

D15-BOR-21 (0-0.5)



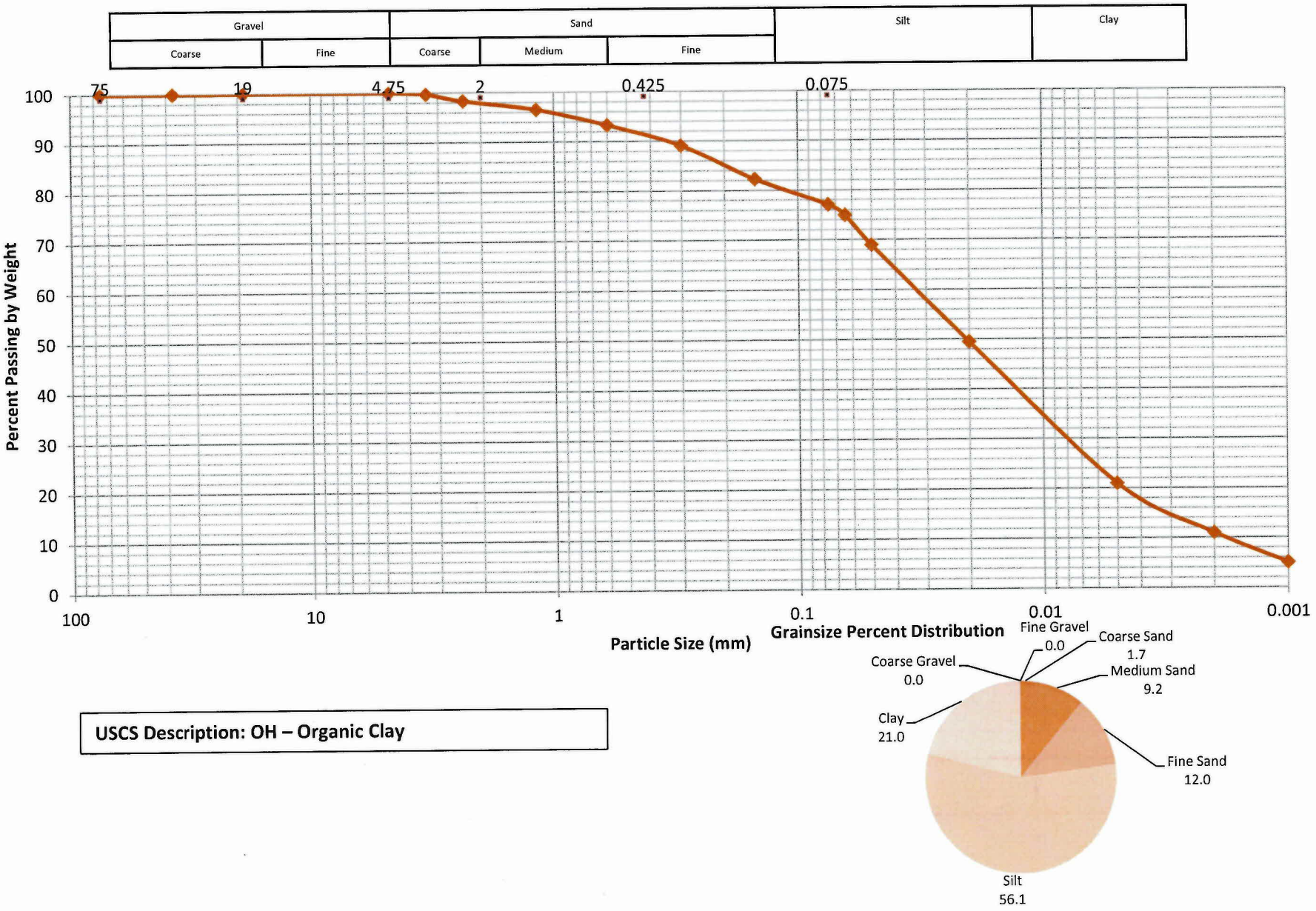
USCS Description: OH – Organic Silt

Grainsize Percent Distribution



Particle Size Distribution

D15-BOR-21 (0.5-1.0)

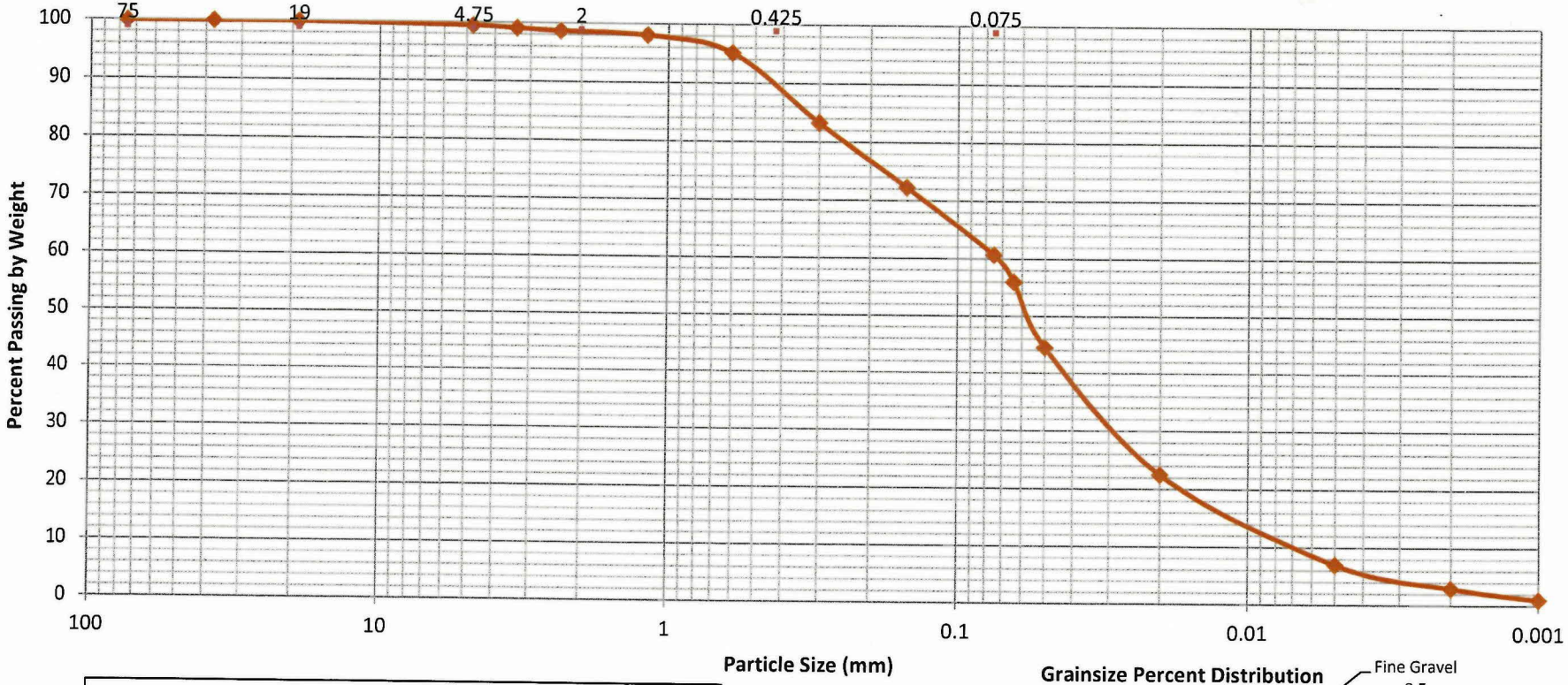


USCS Description: OH – Organic Clay

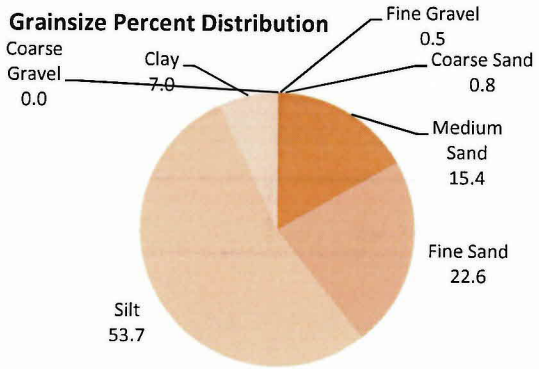
Particle Size Distribution

D15-BOR-22 (0-0.5)

Gravel		Sand			Silt	Clay
Coarse	Fine	Coarse	Medium	Fine		

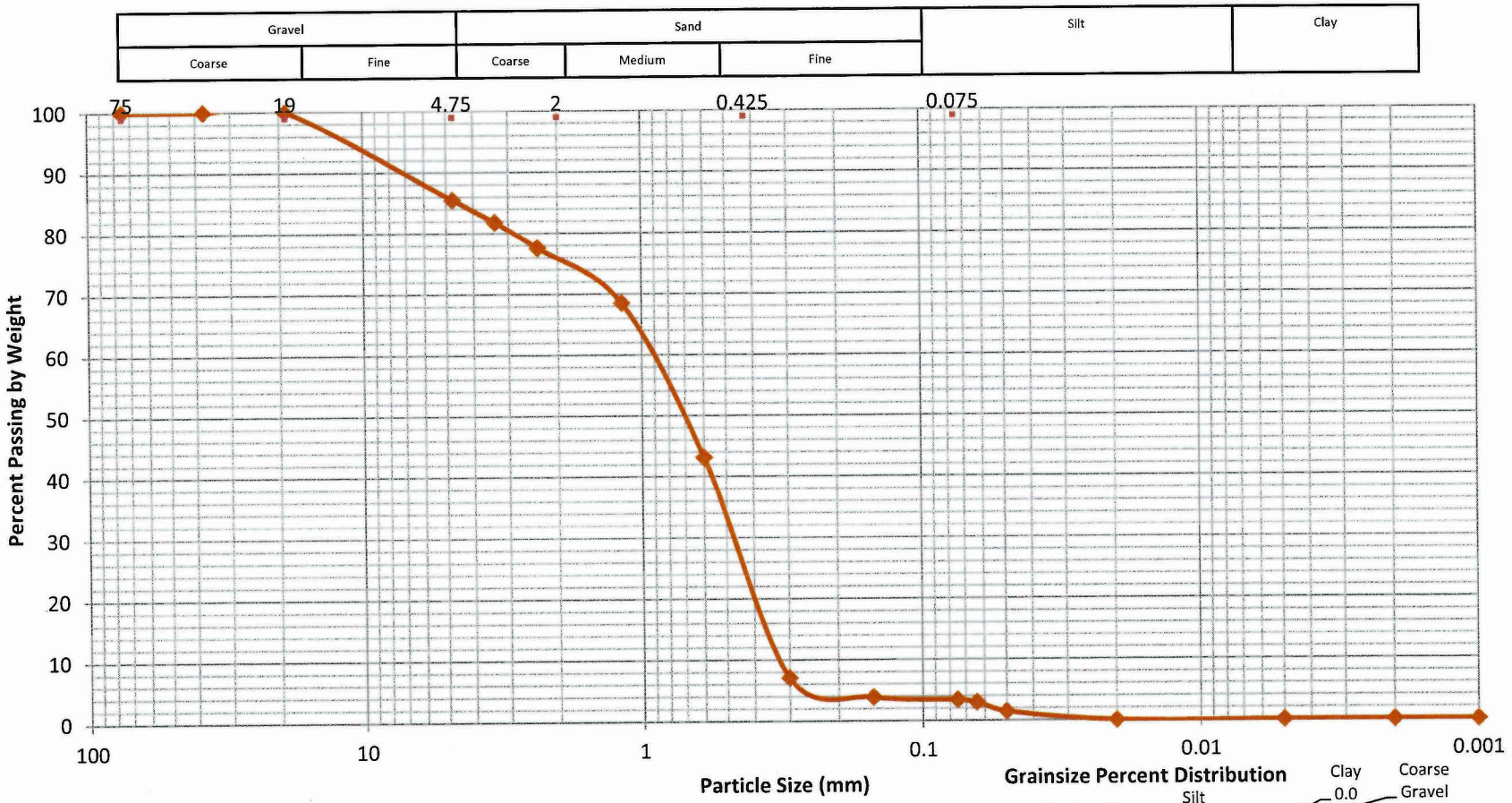


USCS Description: OH – Organic Silt

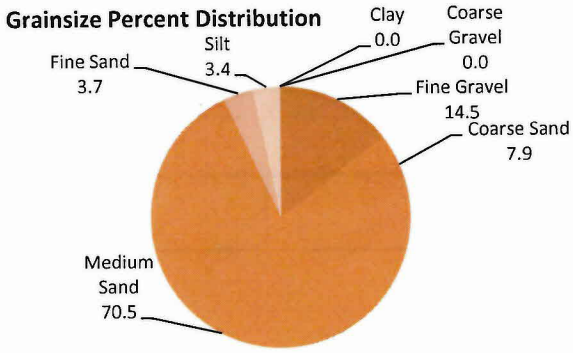


Particle Size Distribution

D15-BOR-22 (0.5-1.0)

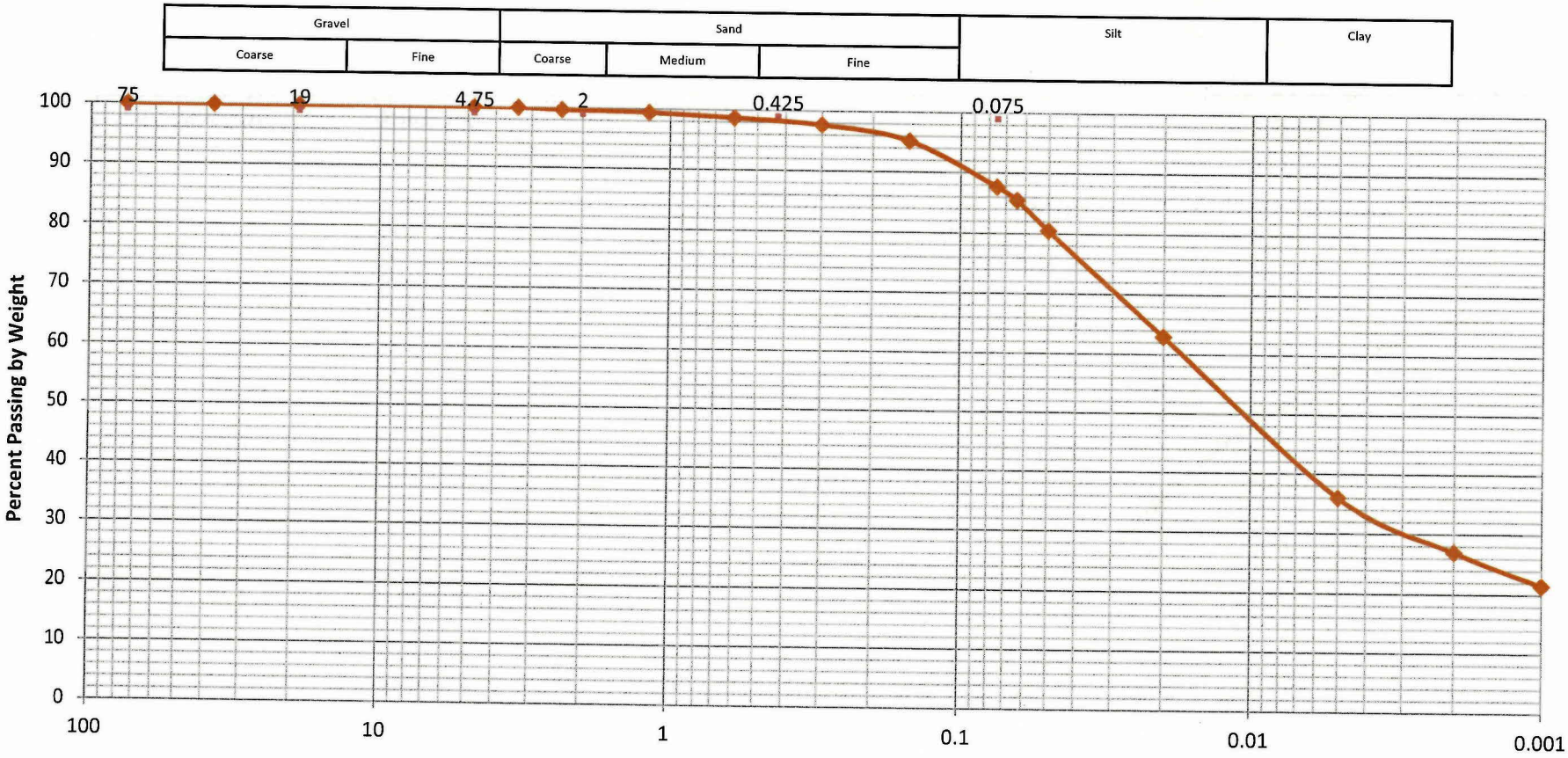


USCS Description: SP – Poorly Graded Sand



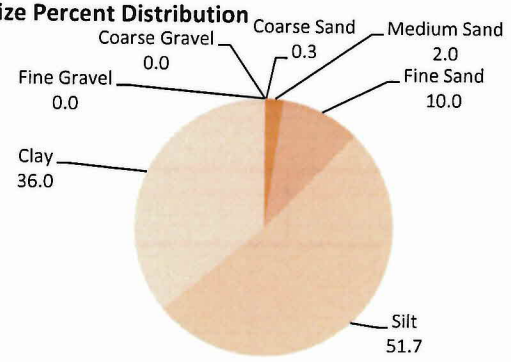
Particle Size Distribution

D15-BOR-22 (8.0-8.5)



USCS Description: CL – Lean Clay

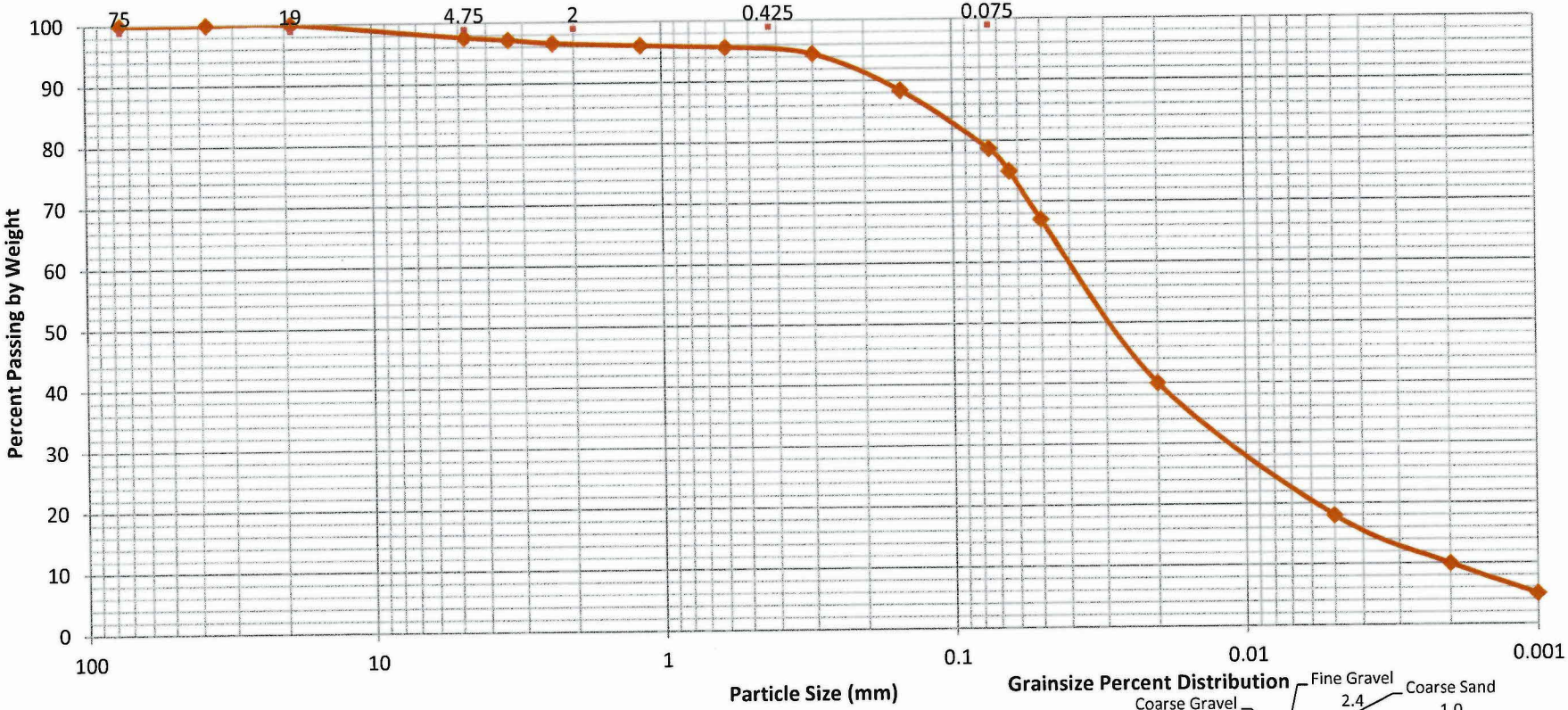
Grainsize Percent Distribution



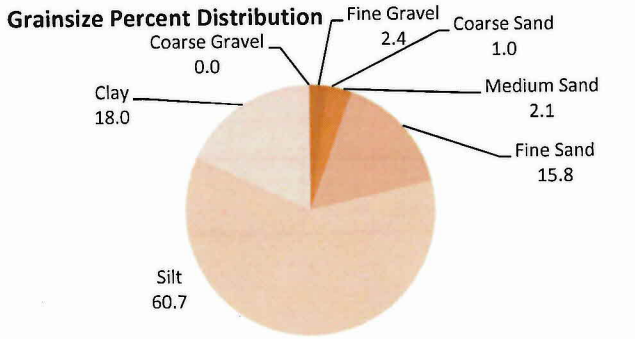
Particle Size Distribution

D15-BOR-23 (0-0.5)

Gravel		Sand			Silt	Clay
Coarse	Fine	Coarse	Medium	Fine		

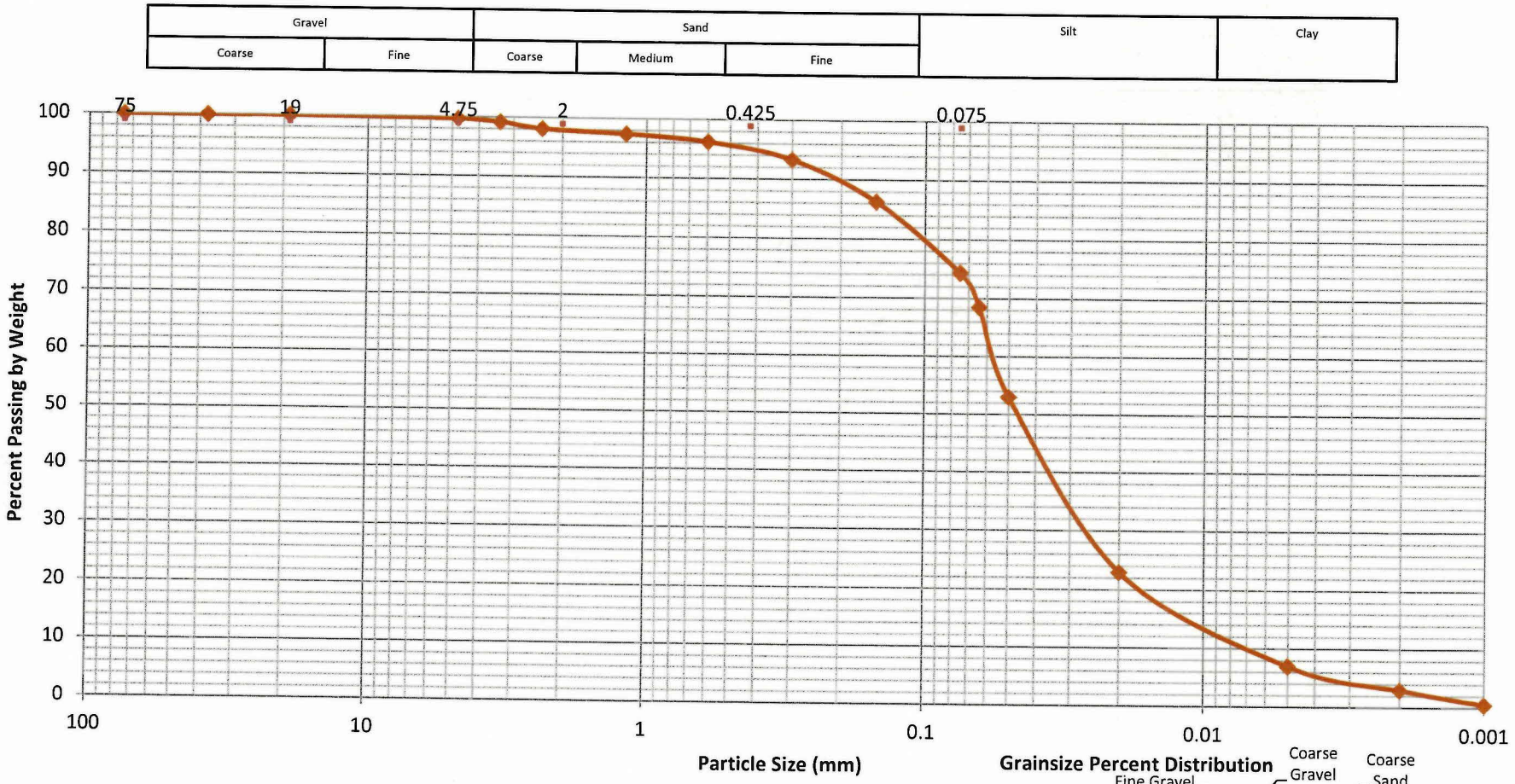


USCS Description: OH – Organic Silt

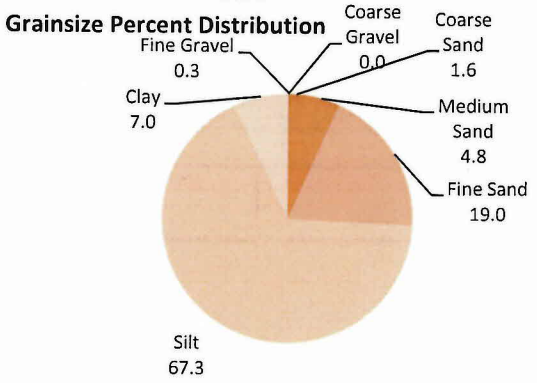


Particle Size Distribution

D15-BOR-23 (0.5-1.0)

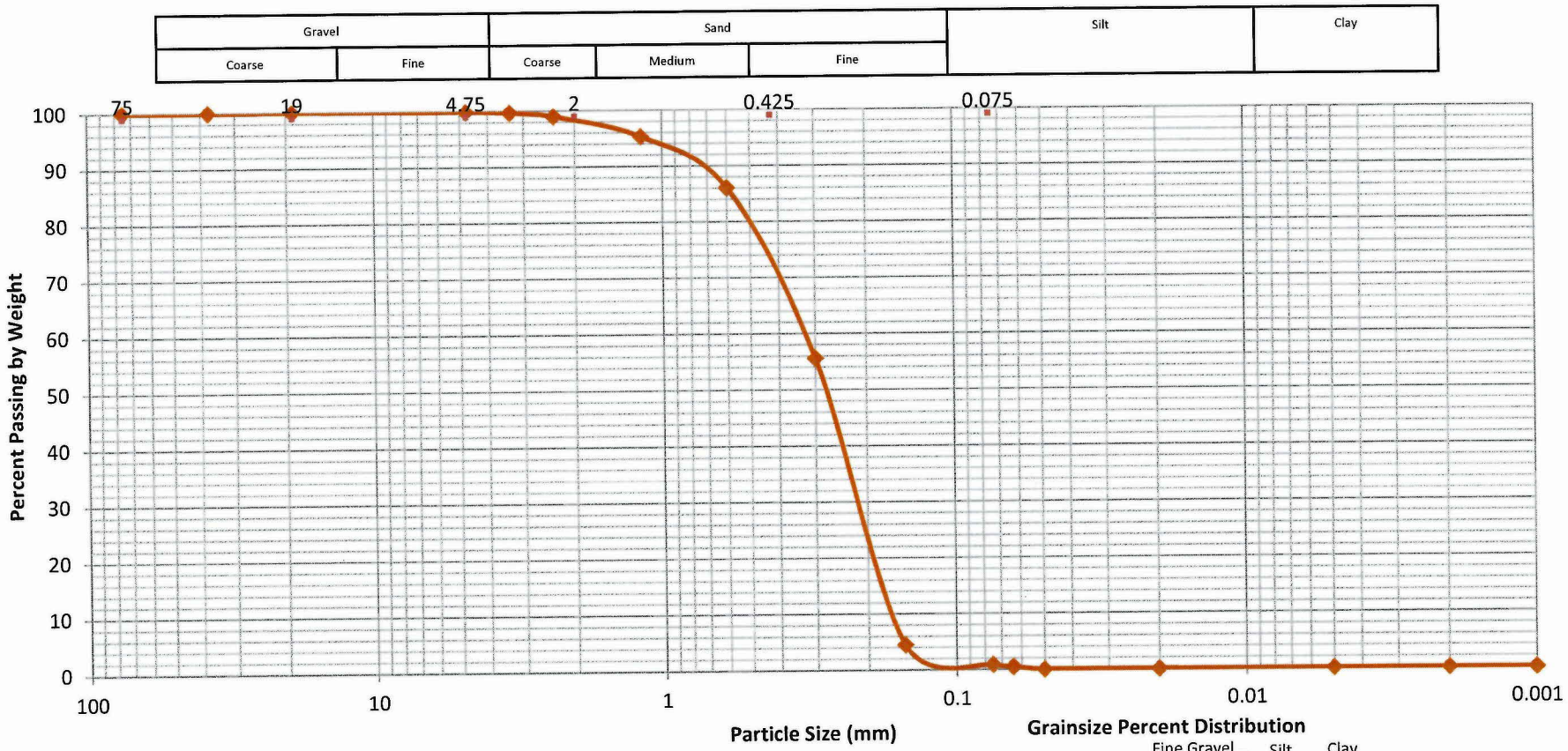


USCS Description: OH – Organic Silt



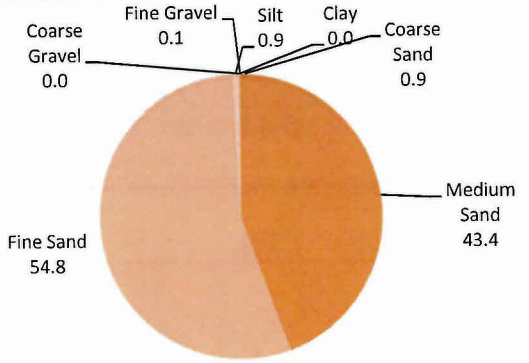
Particle Size Distribution

D15-BOR-24 (0-0.5)



USCS Description: SM – Silty Sand

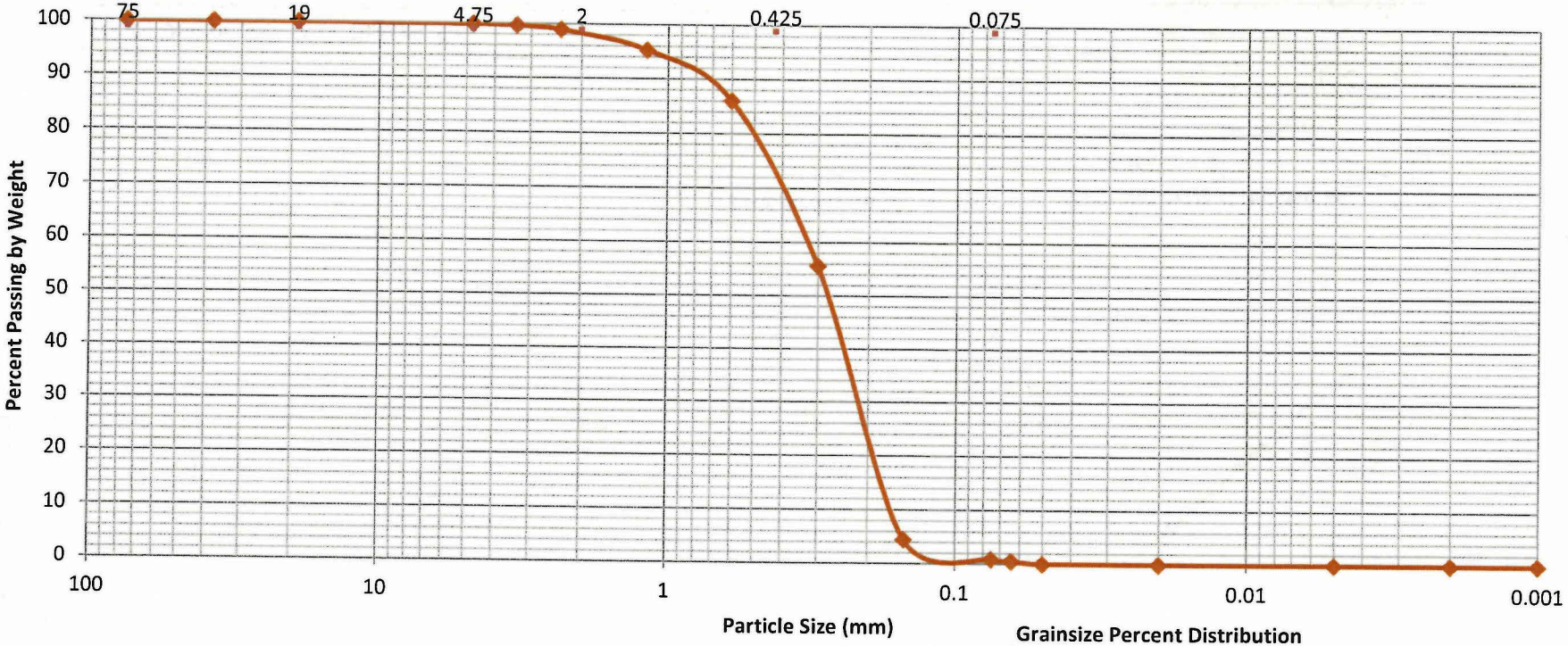
Grainsize Percent Distribution



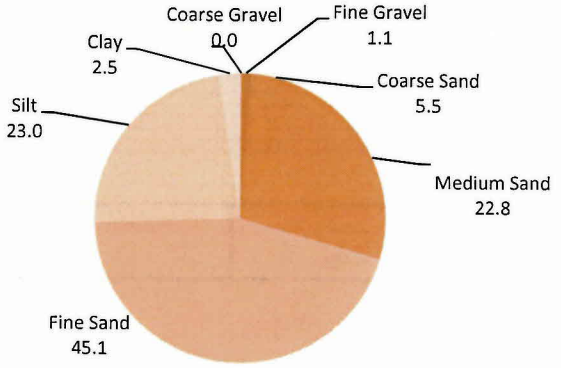
Particle Size Distribution

D15-BOR-24 (0.5-1.0)

Gravel		Sand			Silt	Clay
Coarse	Fine	Coarse	Medium	Fine		



Grainsize Percent Distribution

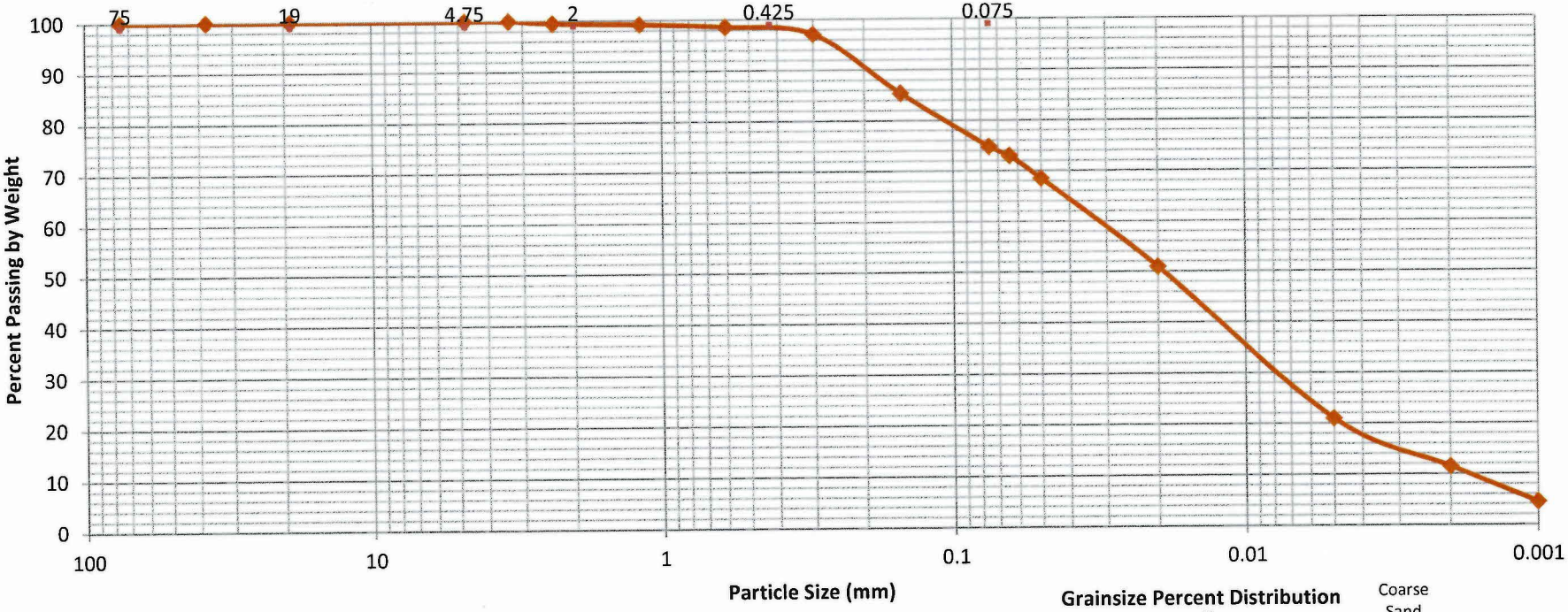


USCS Description: SC – Clayey Sand

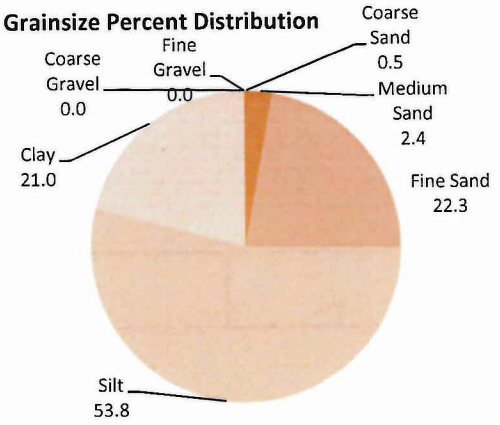
Particle Size Distribution

D16-BOR-09 (0-0.5)

Gravel		Sand			Silt	Clay
Coarse	Fine	Coarse	Medium	Fine		

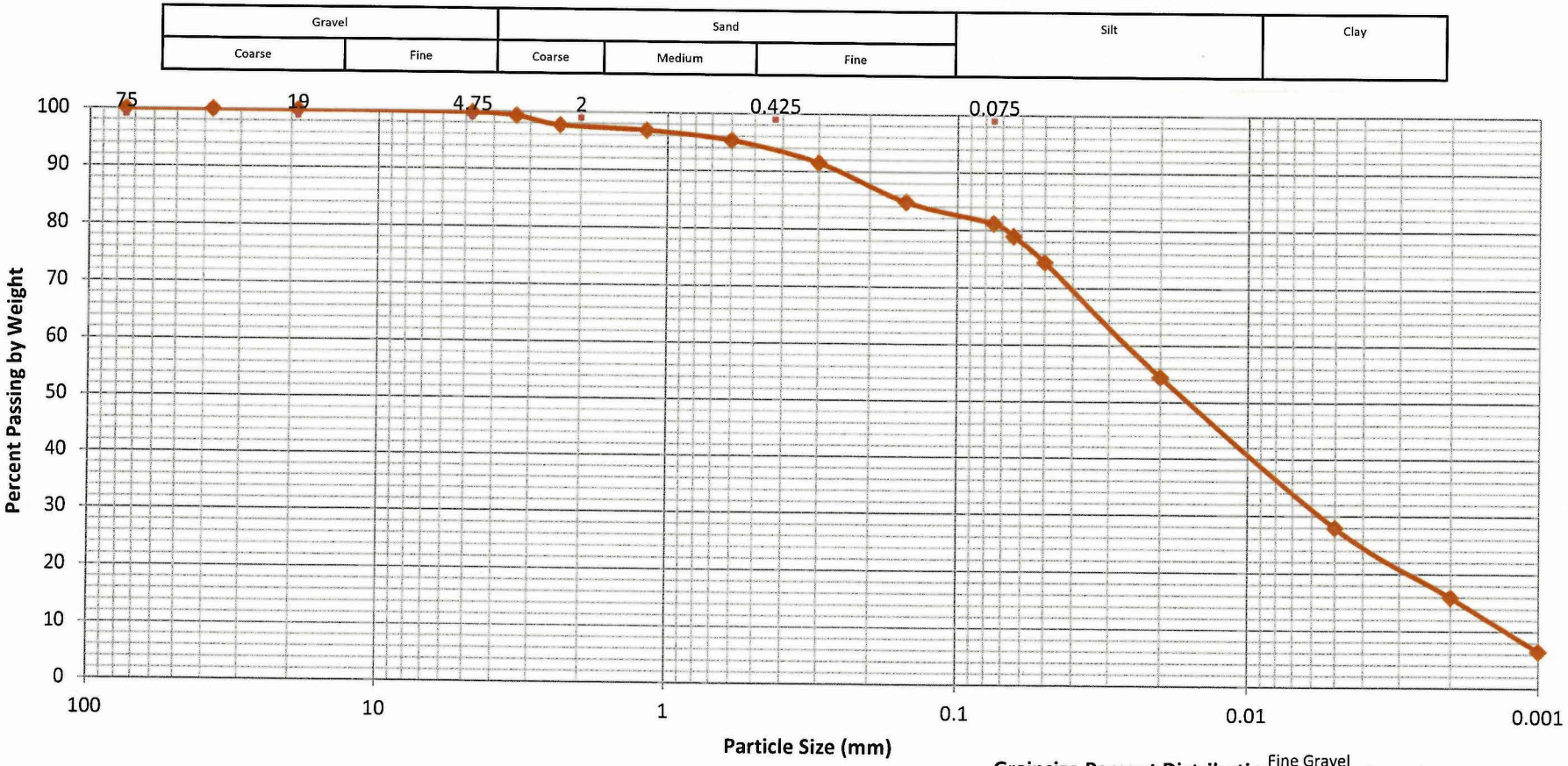


USCS Description: OH – Organic Silt

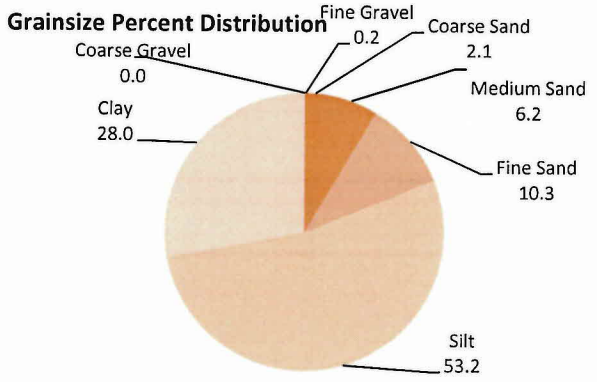


Particle Size Distribution

D16-BOR-09 (0.5-1.0)



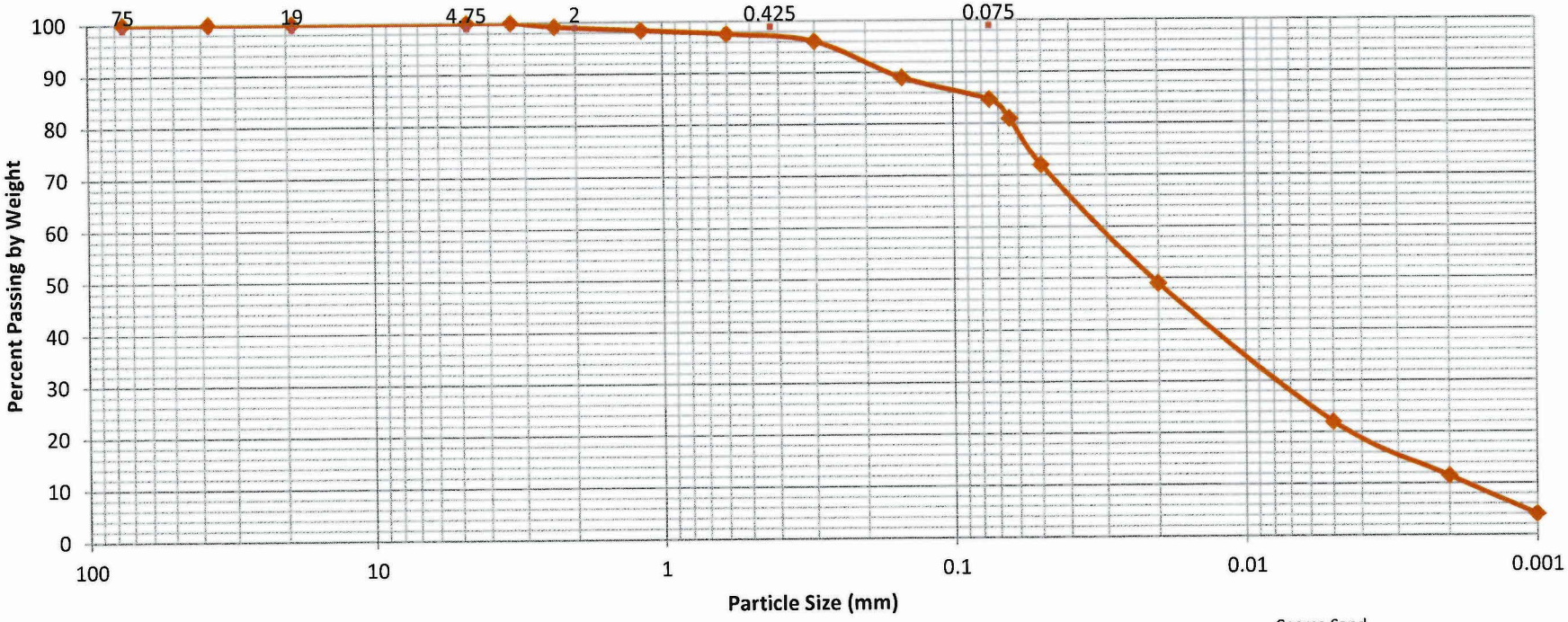
USCS Description: OH – Organic Silt



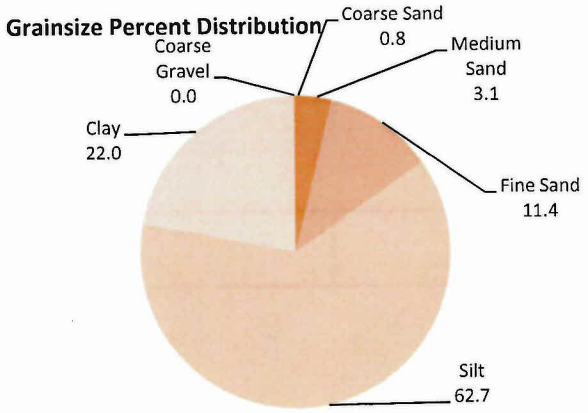
Particle Size Distribution

D16-BOR-10 (0-0.5)

Gravel		Sand			Silt	Clay
Coarse	Fine	Coarse	Medium	Fine		

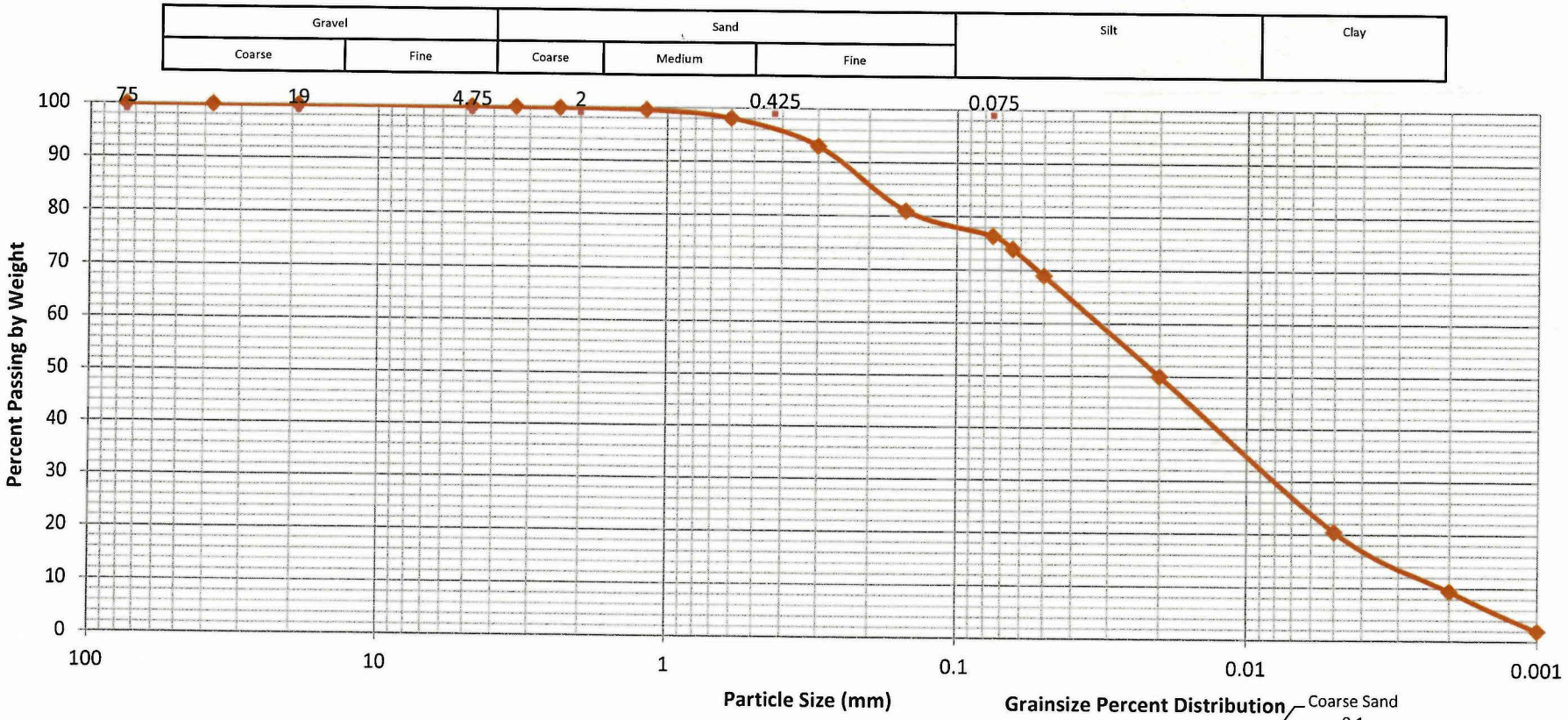


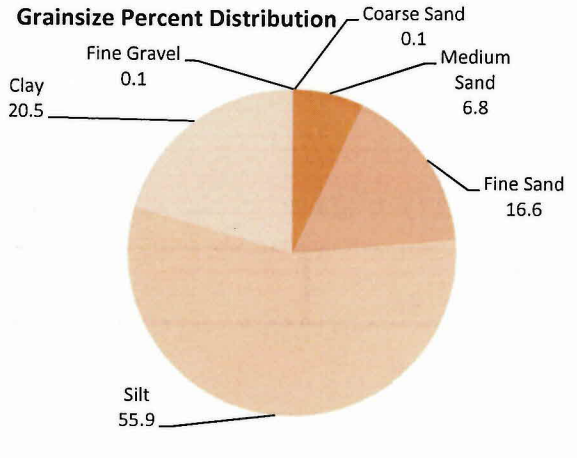
USCS Description: OH – Organic Silt



Particle Size Distribution

D16-BOR-10 (0.5-1.0)

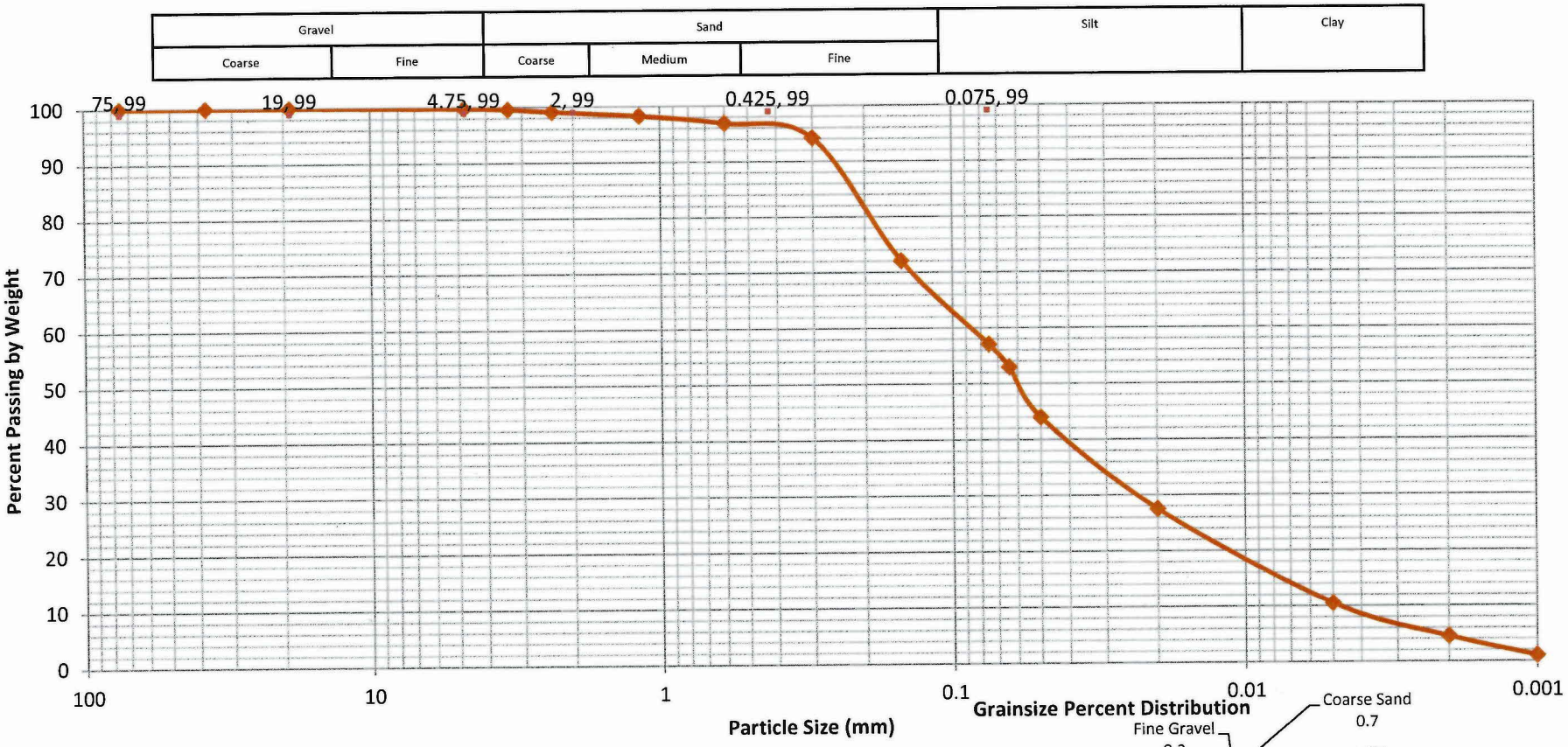


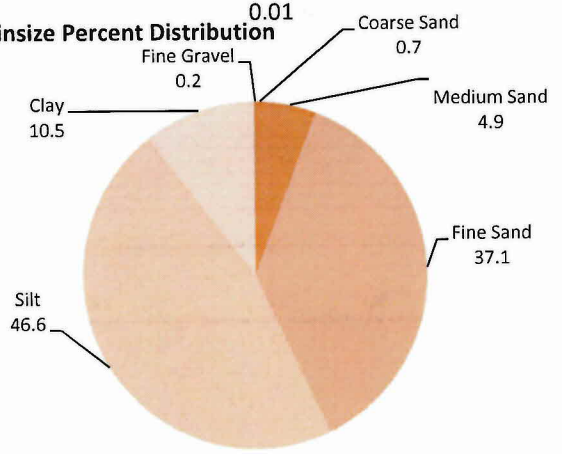


USCS Description: OH – Organic Silt

Particle Size Distribution

D16-BOR-11 (0-0.5)

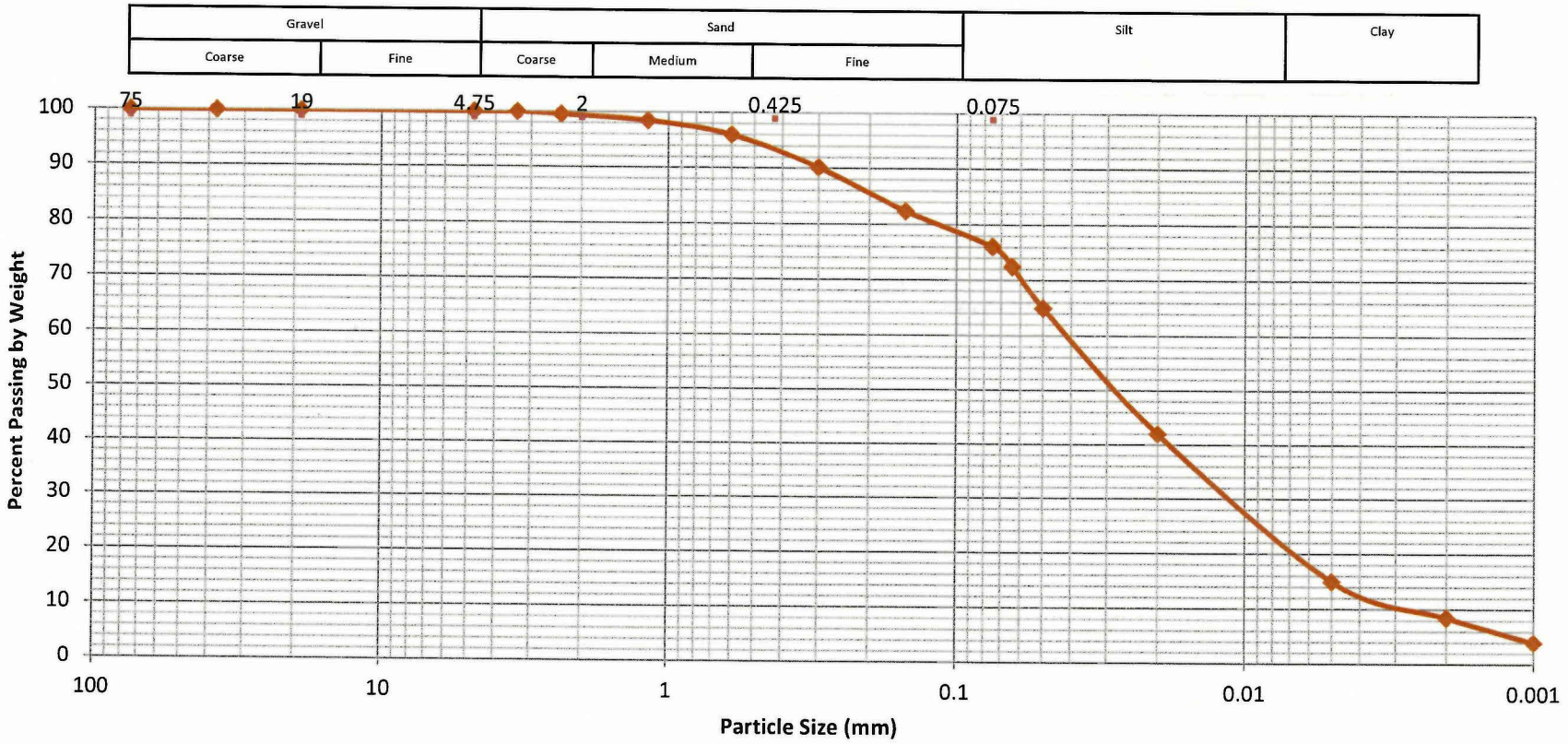




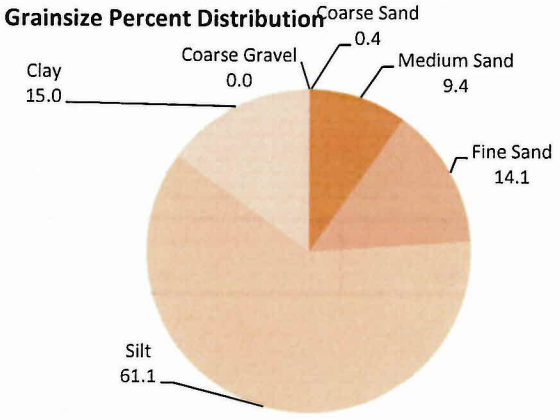
USCS Description: OH – Organic Silt

Particle Size Distribution

D16-BOR-11 (0.5-1.0)

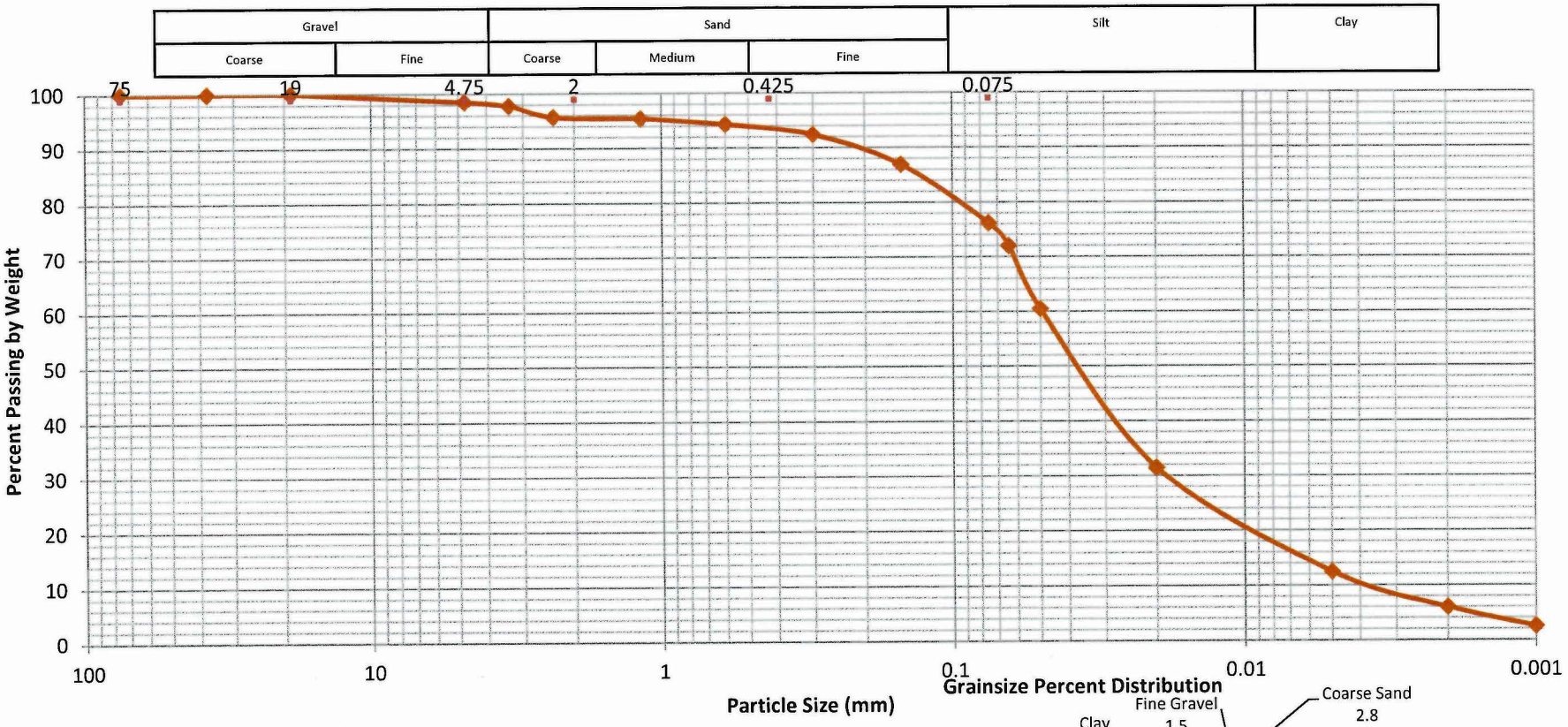


USCS Description: OH – Organic Clay

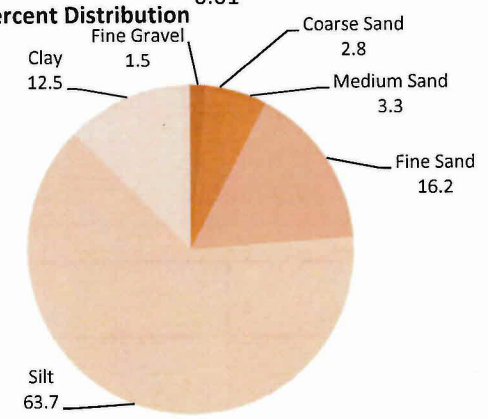


Particle Size Distribution

D16-BOR-12 (0-0.5)

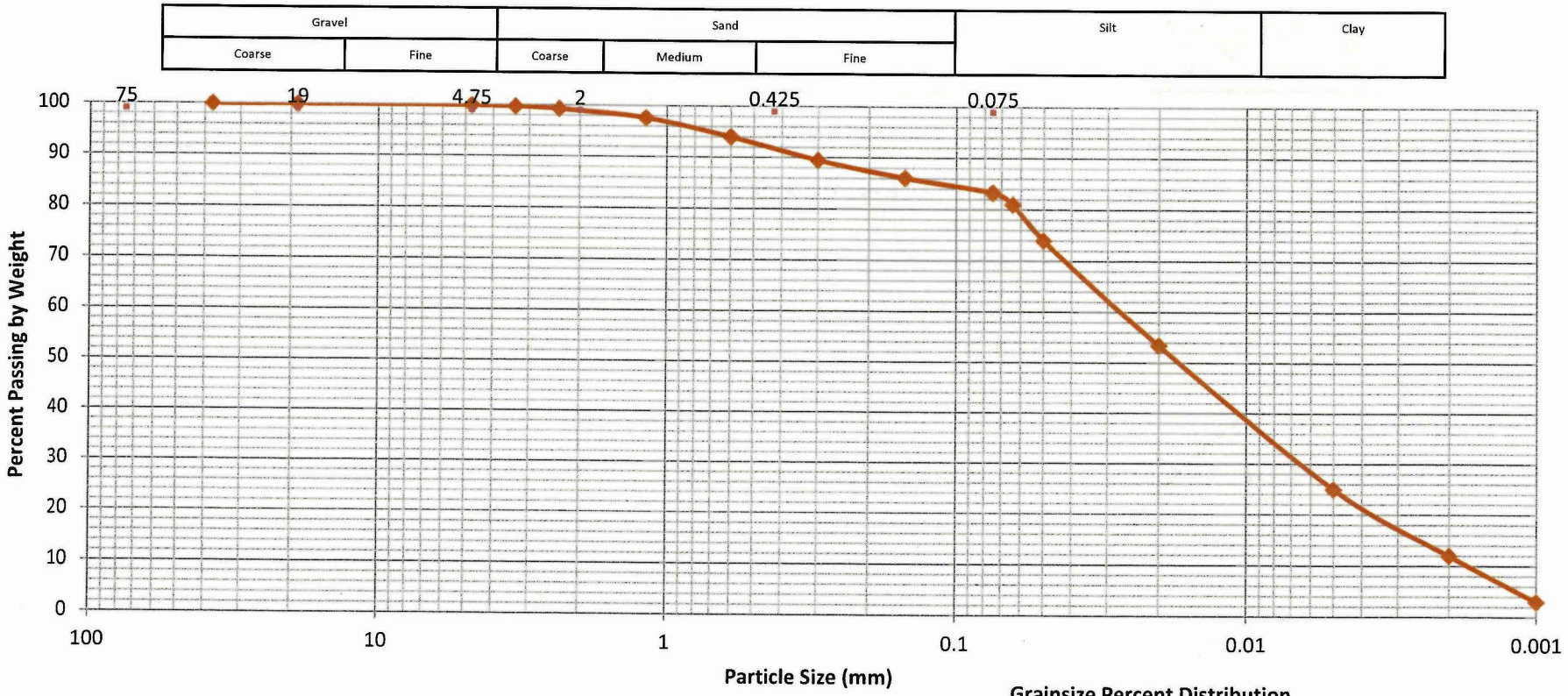


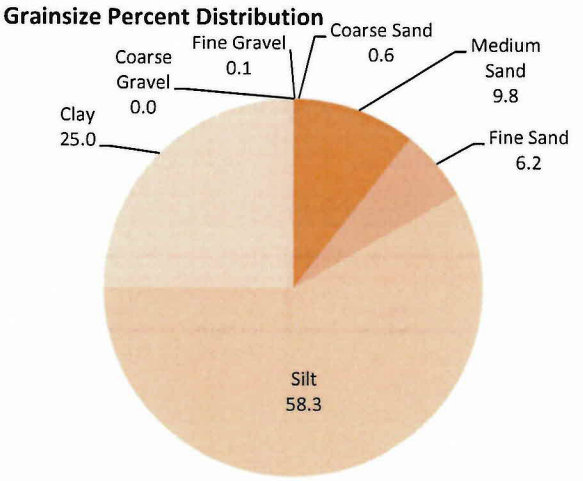
USCS Description: OH – Organic Clay



Particle Size Distribution

D16-BOR-12 (0.5-1.0)

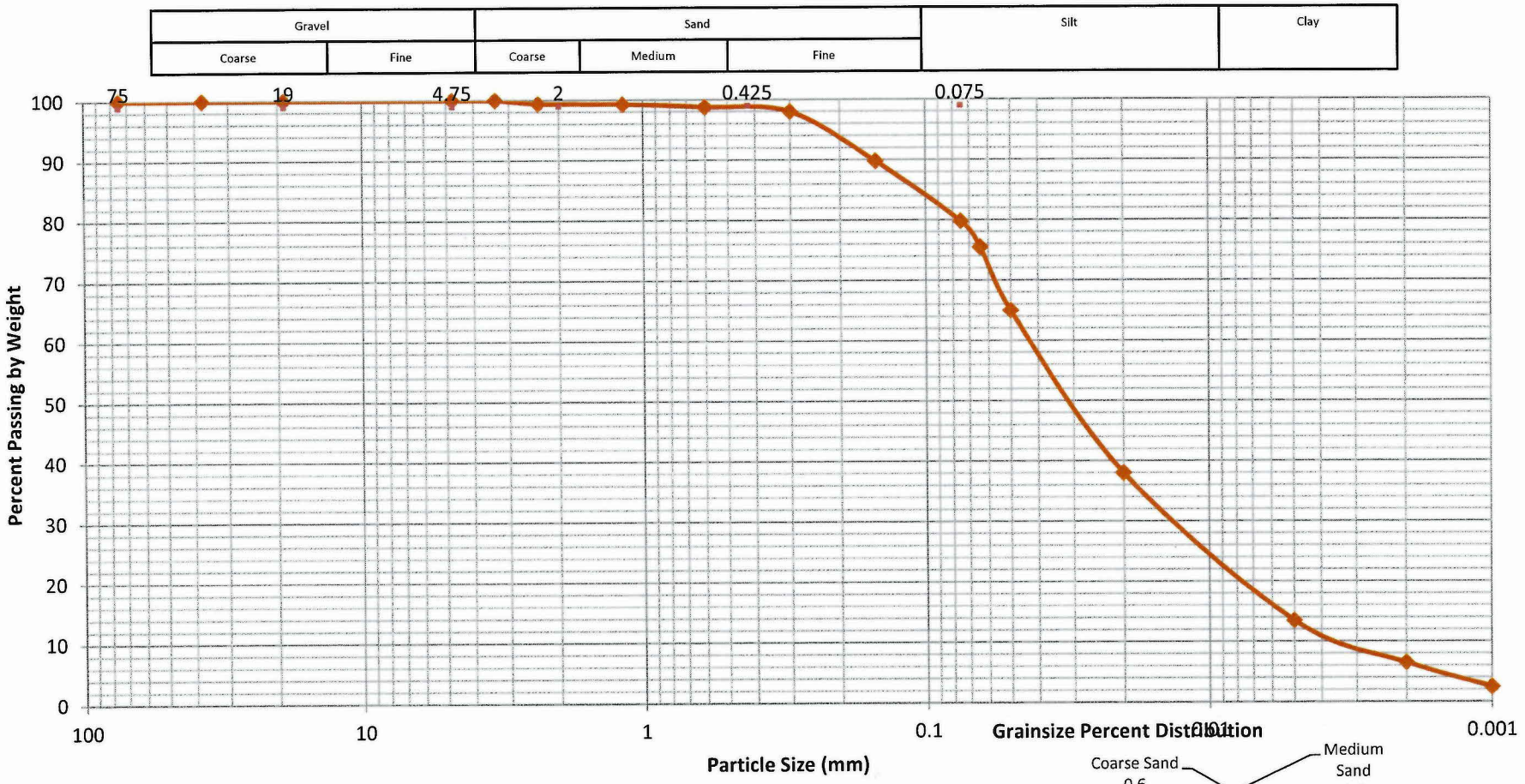




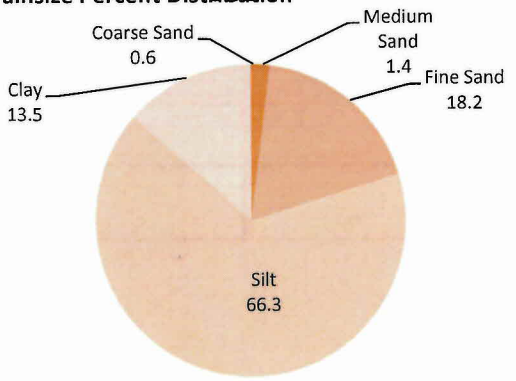
USCS Description: OH – Organic Clay

Particle Size Distribution

D16-BOR-13 (0-0.5)



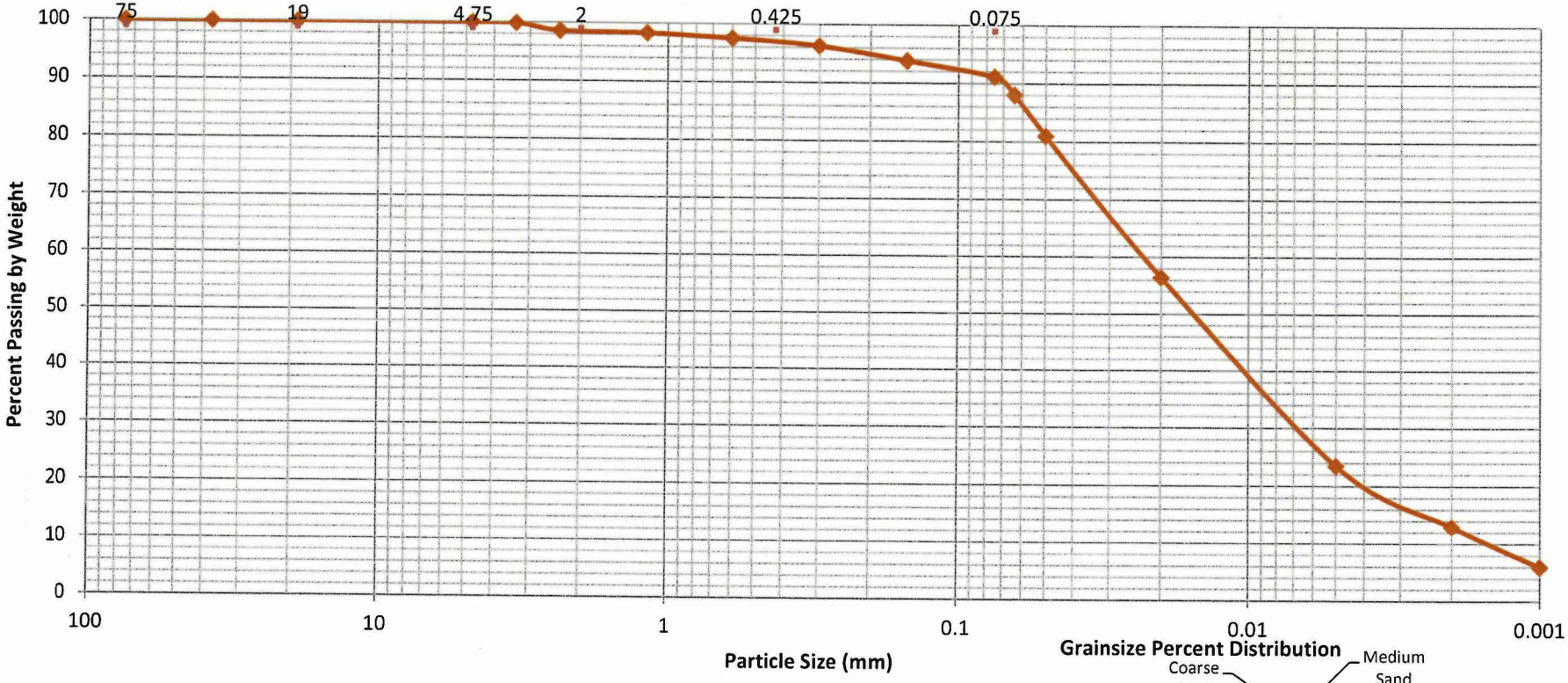
USCS Description: OH – Organic Silt



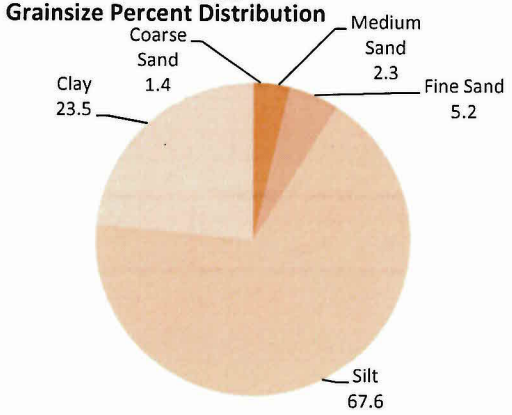
Particle Size Distribution

D16-BOR-13 (0.5-1.0)

Gravel		Sand			Silt	Clay
Coarse	Fine	Coarse	Medium	Fine		

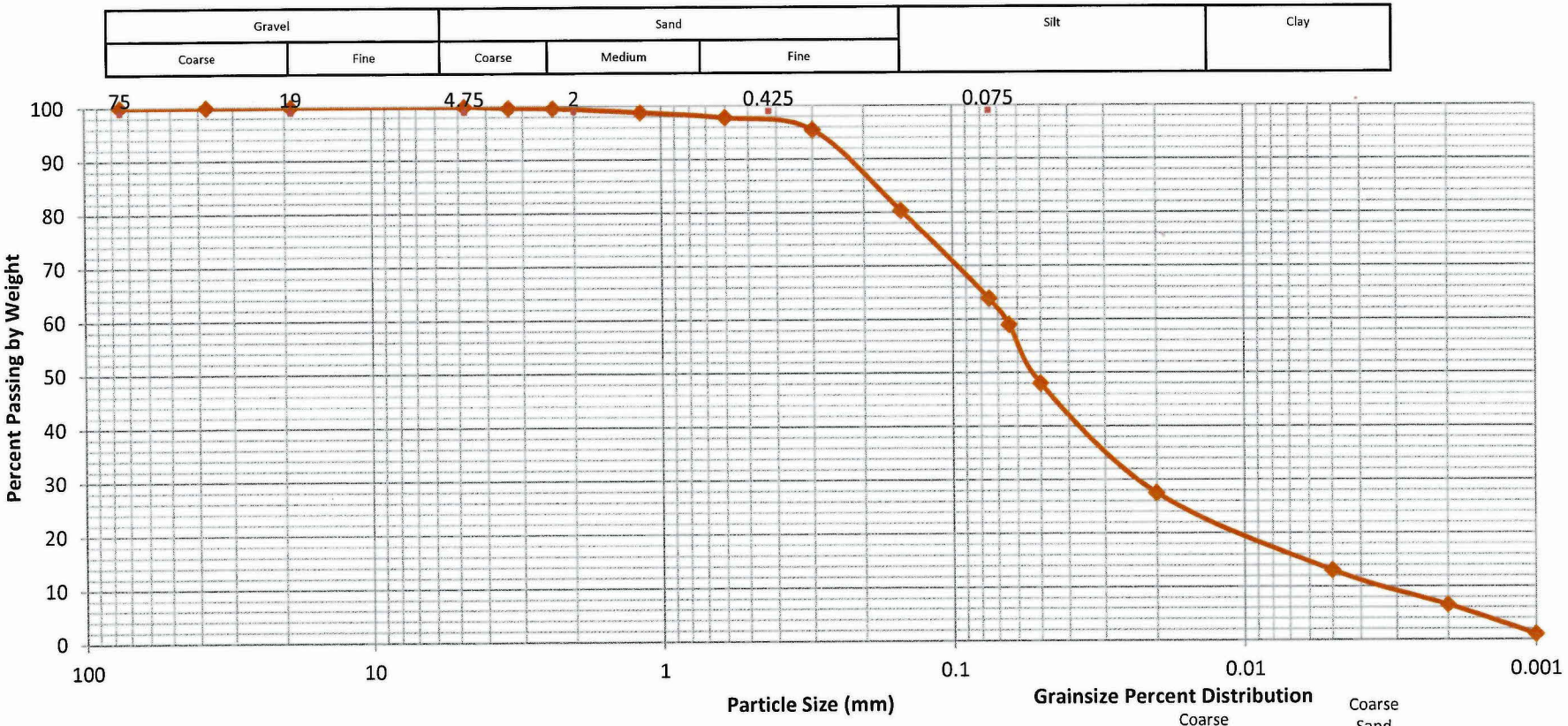


USCS Description: OH – Organic Silt

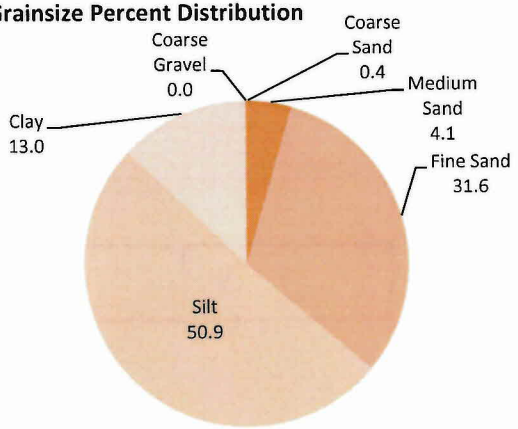


Particle Size Distribution

D16-BOR-14 (0-0.5)



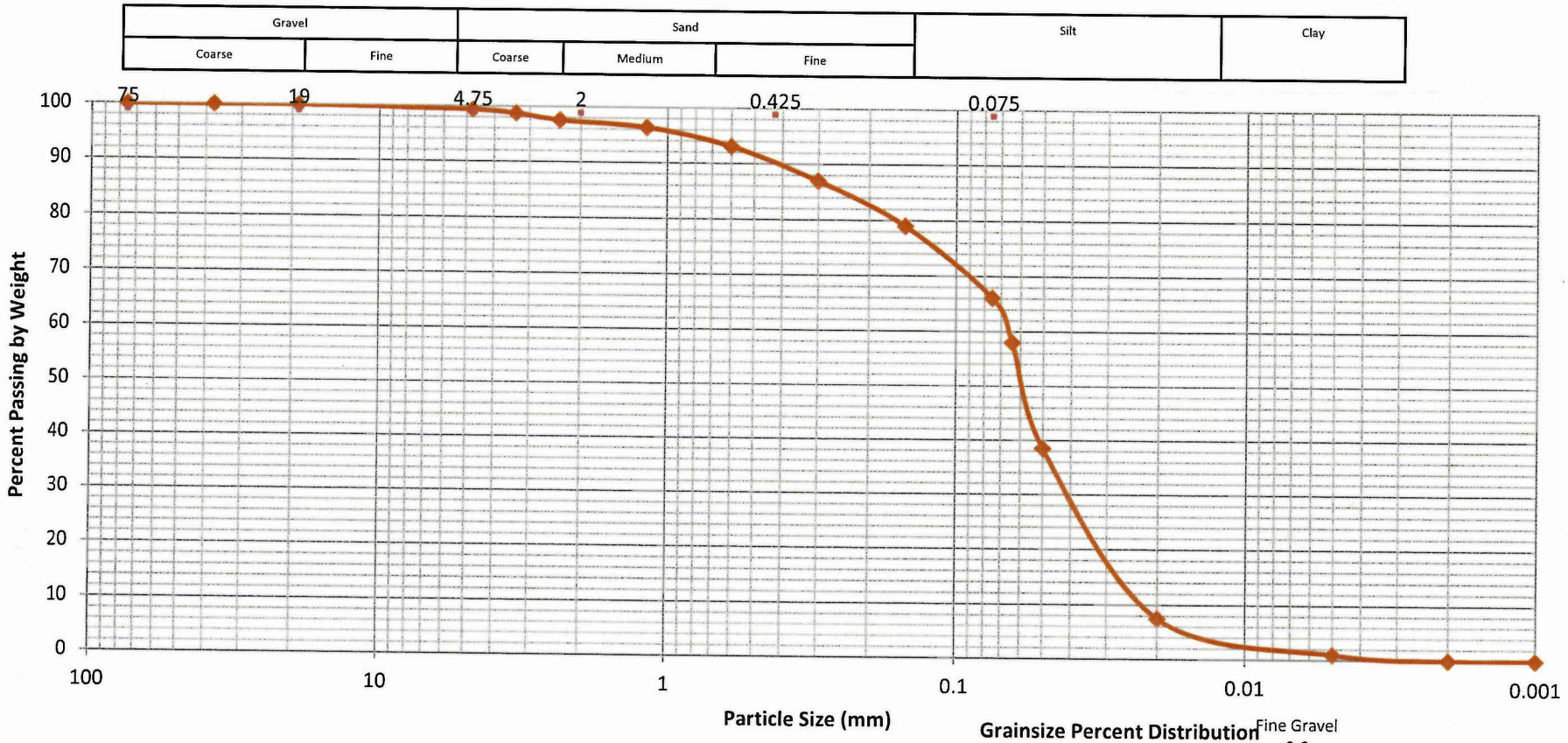
Grainsize Percent Distribution



USCS Description: OH – Organic Silt

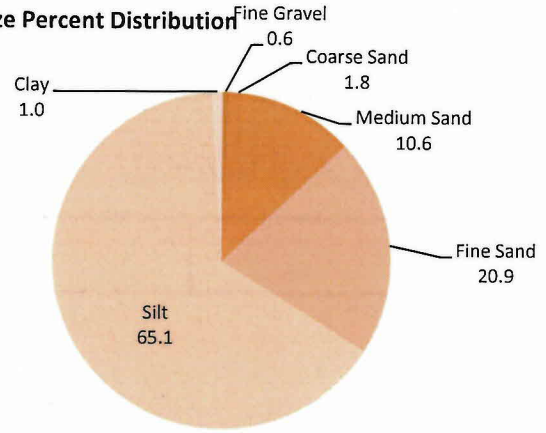
Particle Size Distribution

D16-BOR-14 (0.5-1.0)



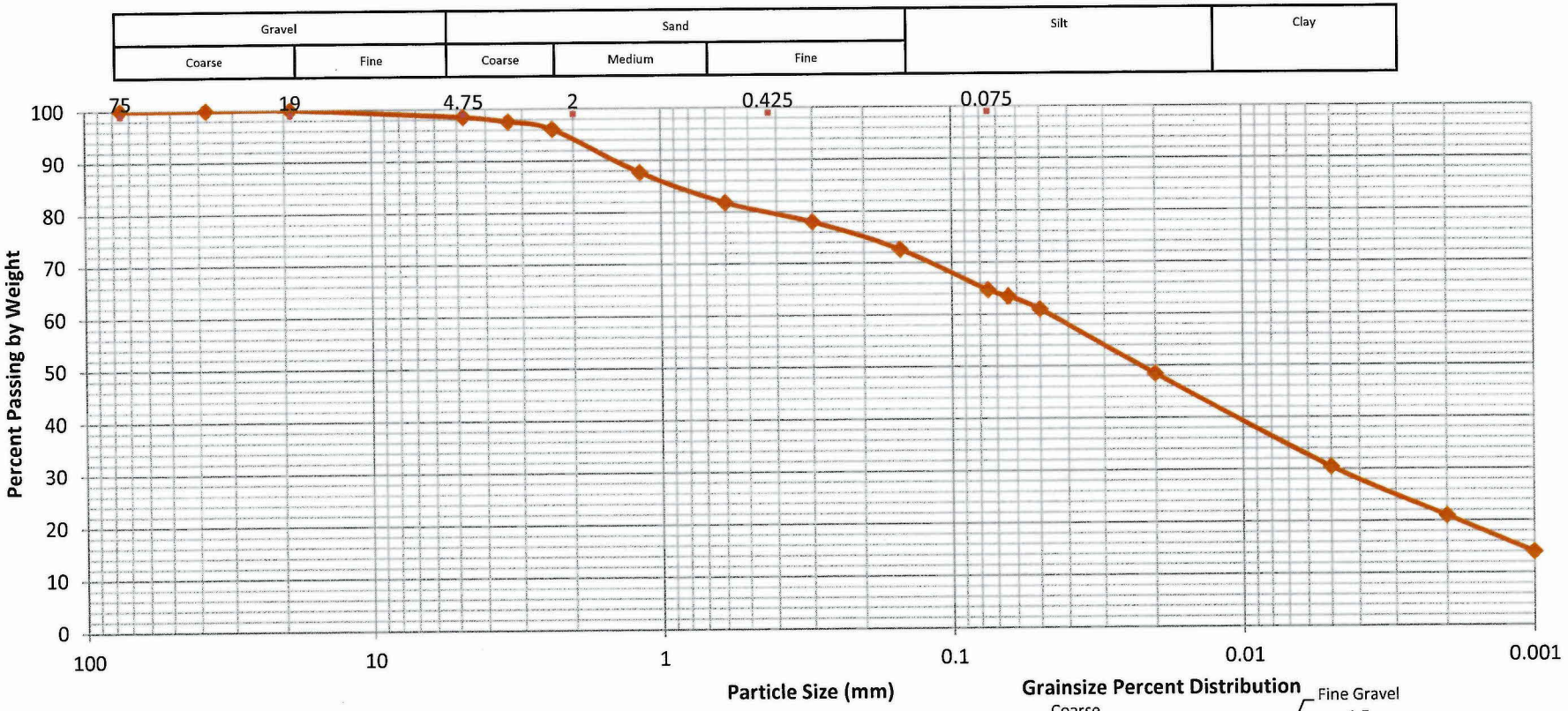
USCS Description: OH – Organic Silt

Grainsize Percent Distribution

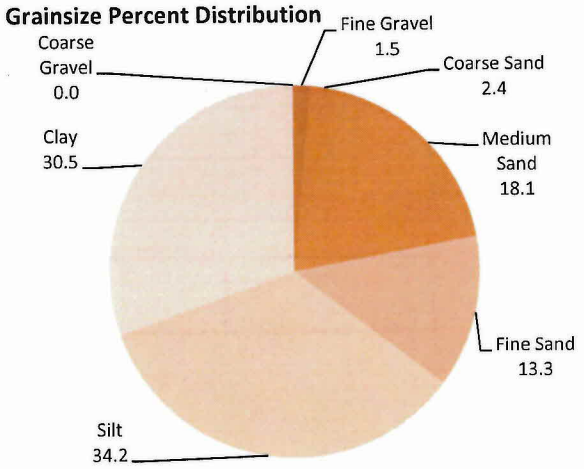


Particle Size Distribution

D16-BOR-14 (9.0-9.5)

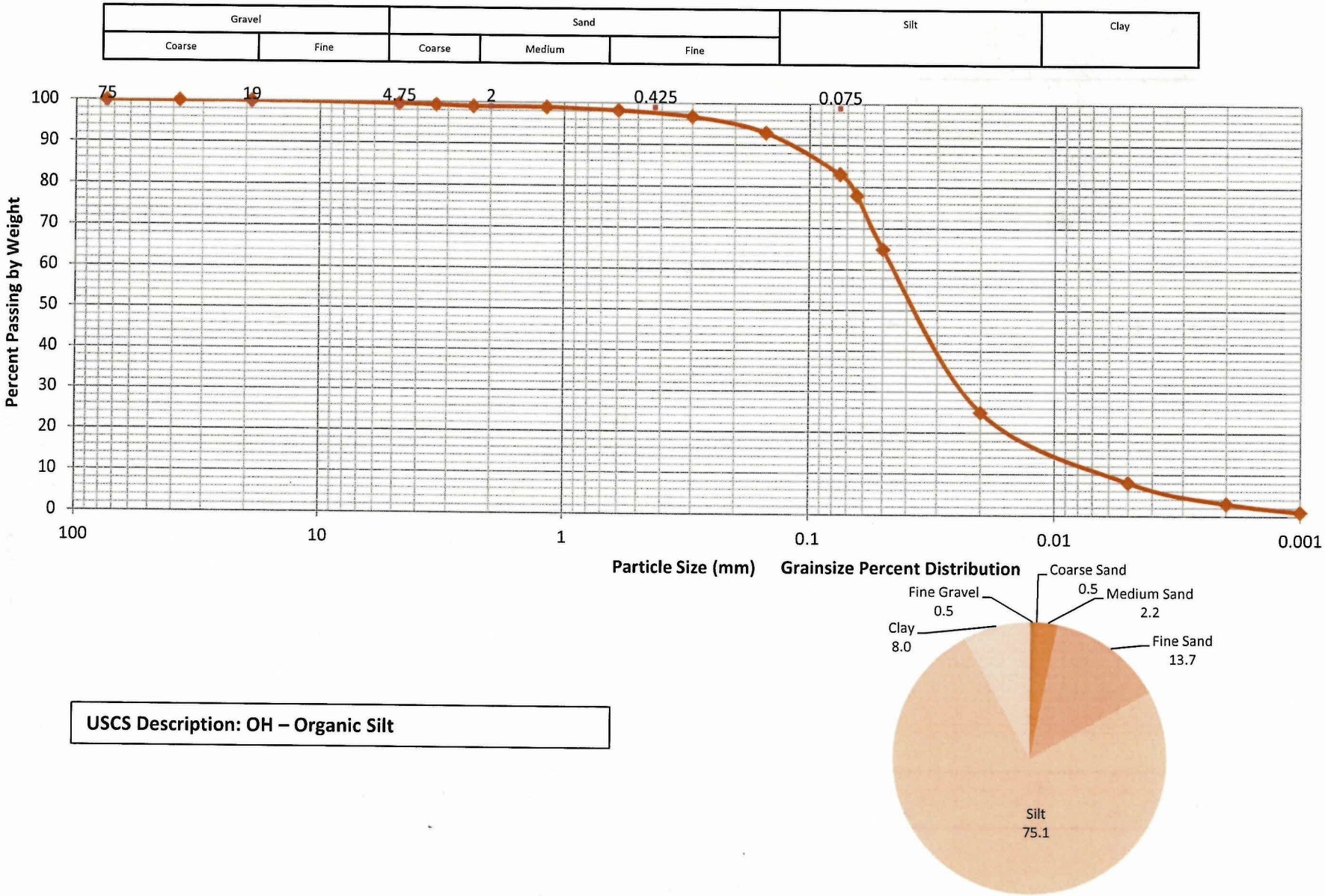


USCS Description: CL – Lean CLay



Particle Size Distribution

E16-BOR-07 (0-0.5)



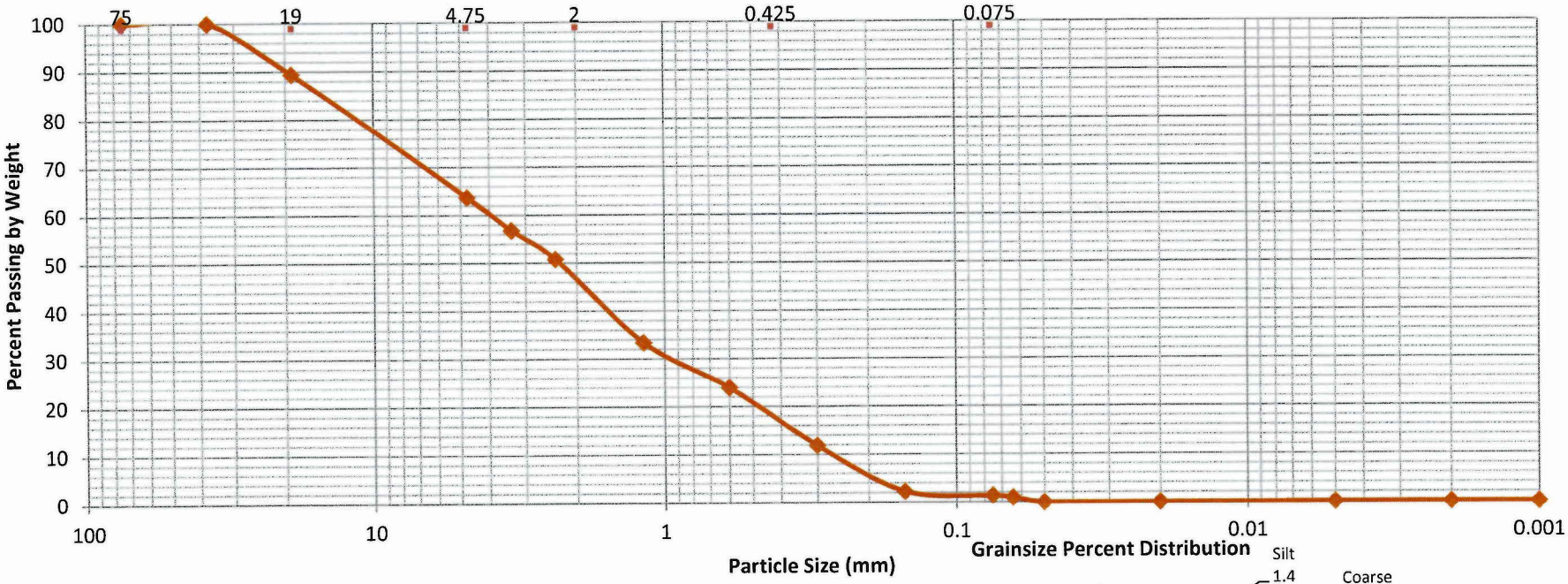
USCS Description: OH – Organic Silt

Grainsize Percent Distribution

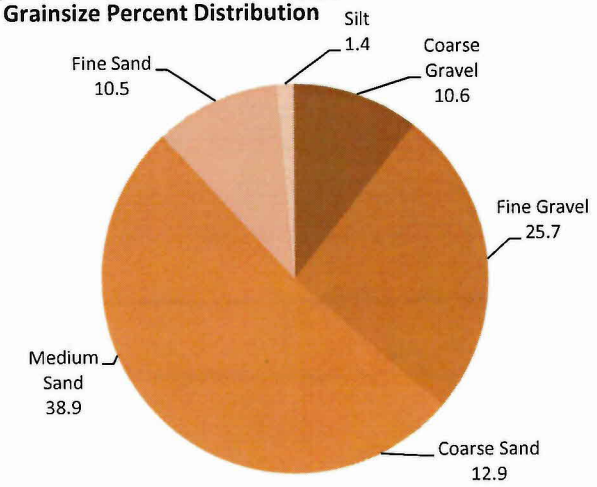
Particle Size Distribution

E16-BOR-07 (0.5-1.0)

Gravel		Sand			Silt	Clay
Coarse	Fine	Coarse	Medium	Fine		

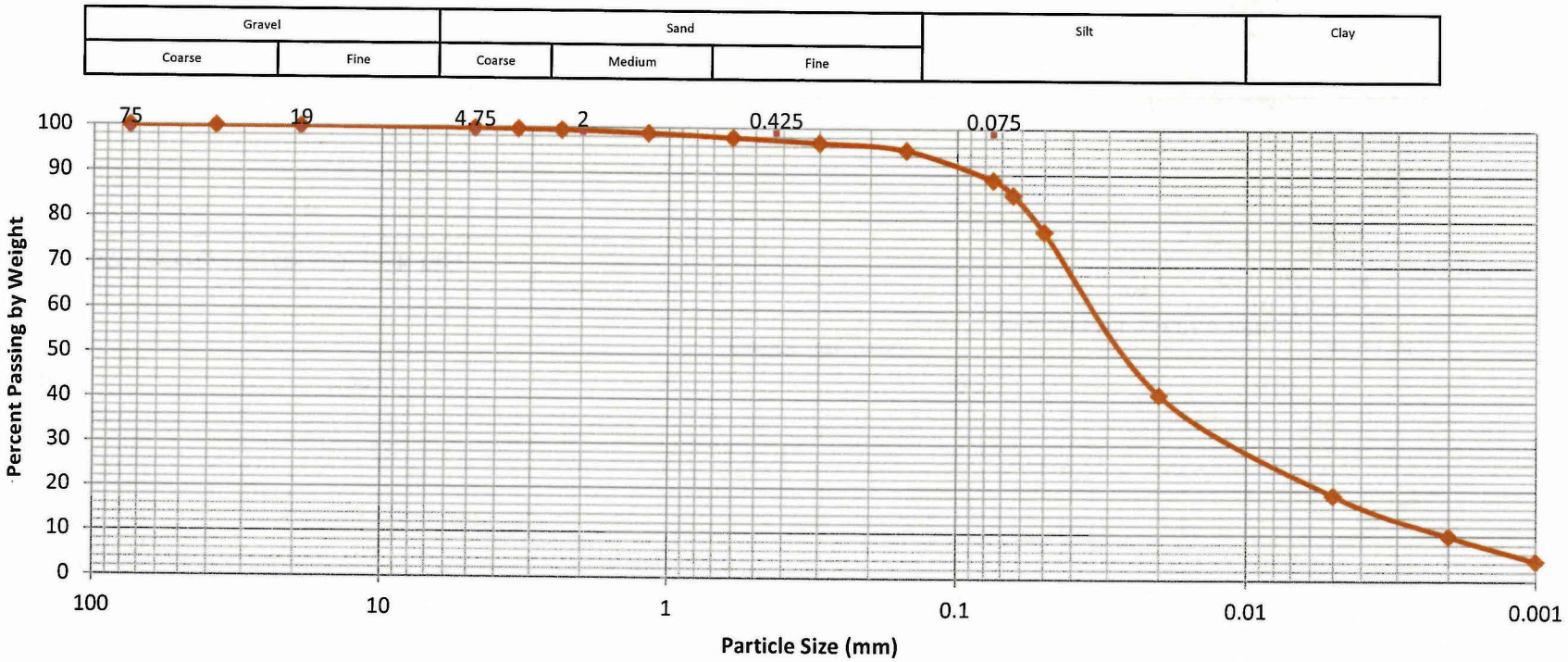


USCS Description: SW – Well Graded Sand

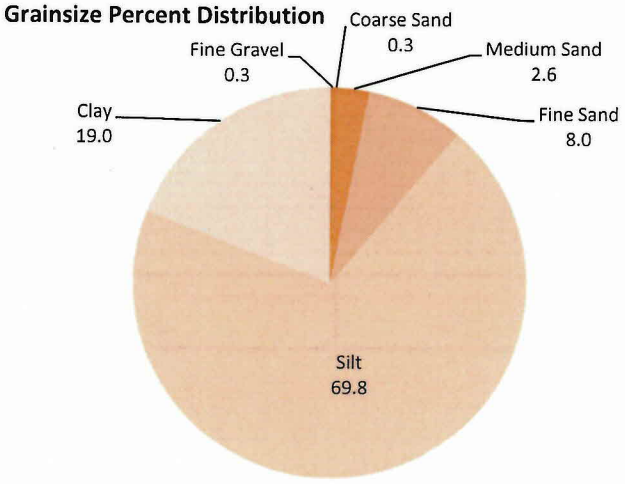


Particle Size Distribution

E16-BOR-08 (0-0.5)

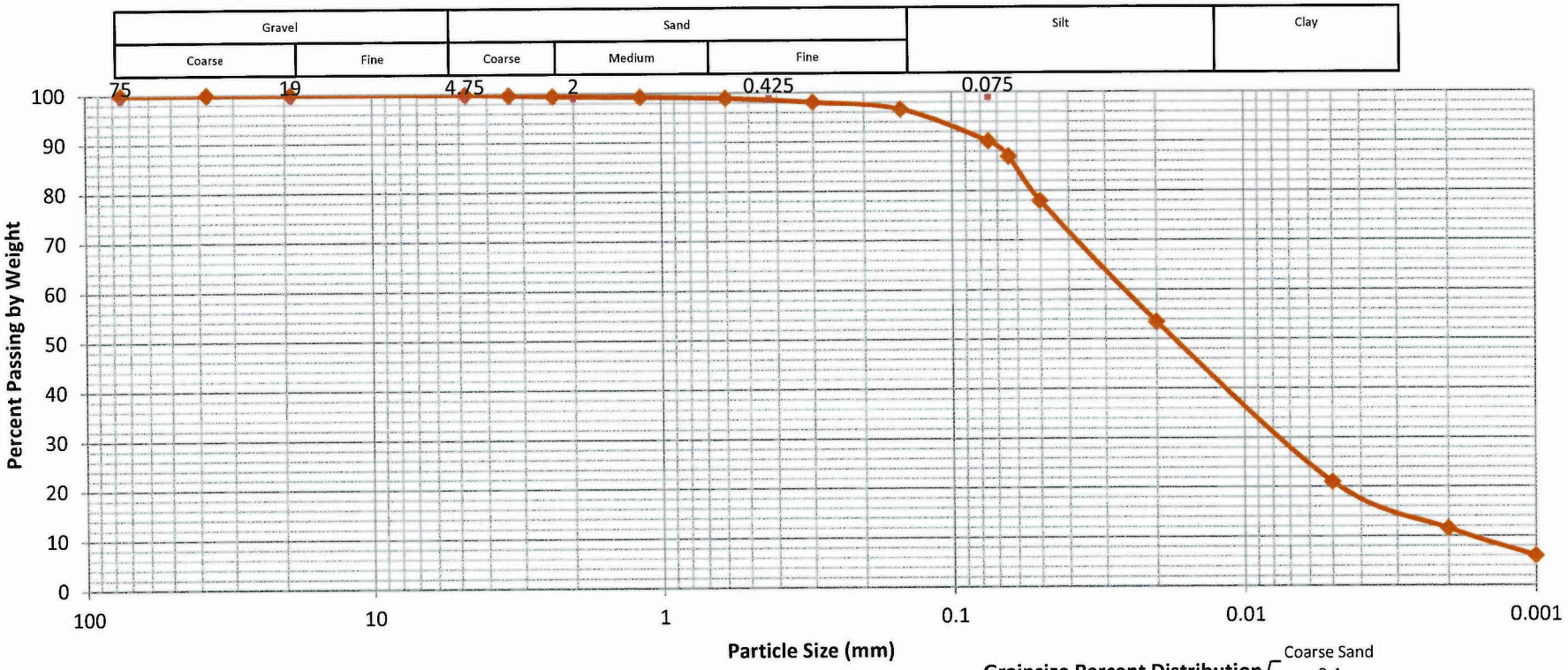


USCS Description: OH – Organic Silt



Particle Size Distribution

E16-BOR-08 (0.5-1.0)



USCS Description: OH – Organic Clay